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MARCH, 1908 NUMBER 3

NORTHWESTERN UNIVERSITY

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BULLETIN
OF THE
SCHOOL *of* PHARMACY

NORTHWESTERN UNIVERSITY BUILDING
LAKE AND DEARBORN STREETS, CHICAGO

Next School Year Begins September 28, 1908

Entered June 24, 1902, at Chicago, Illinois, as Second-Class Matter, under Act of Congress of July 16, 1894.

Northwestern University

THE location of Northwestern University, in and near a large city, and property to the value of $9,000,000 afford advantages that cannot be excelled.

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THE MEDICAL SCHOOL

is one of the oldest, largest, and best equipped. Seven hospitals are open to students. Clinic material is abundant.

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the oldest law school in Chicago, offers unexcelled library facilities and special courses that prepare for immediate practice in any state upon graduation.

THE SCHOOL OF PHARMACY

offers a scientific training in pharmacy, chemistry and drug and food analysis. Special courses for drug clerks.

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offers expert training in theory and practice. Facilities are unsurpassed. Its clinic is the largest in the world.

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affords a scientific preparation for music as an accomplishment and a profession. It is located at Evanston.

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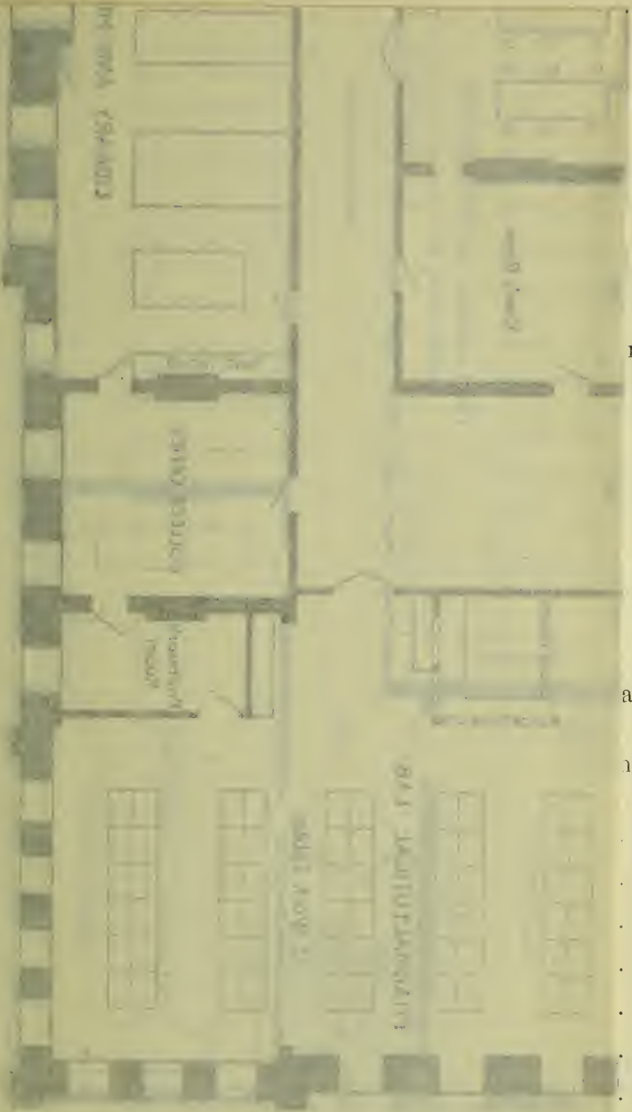
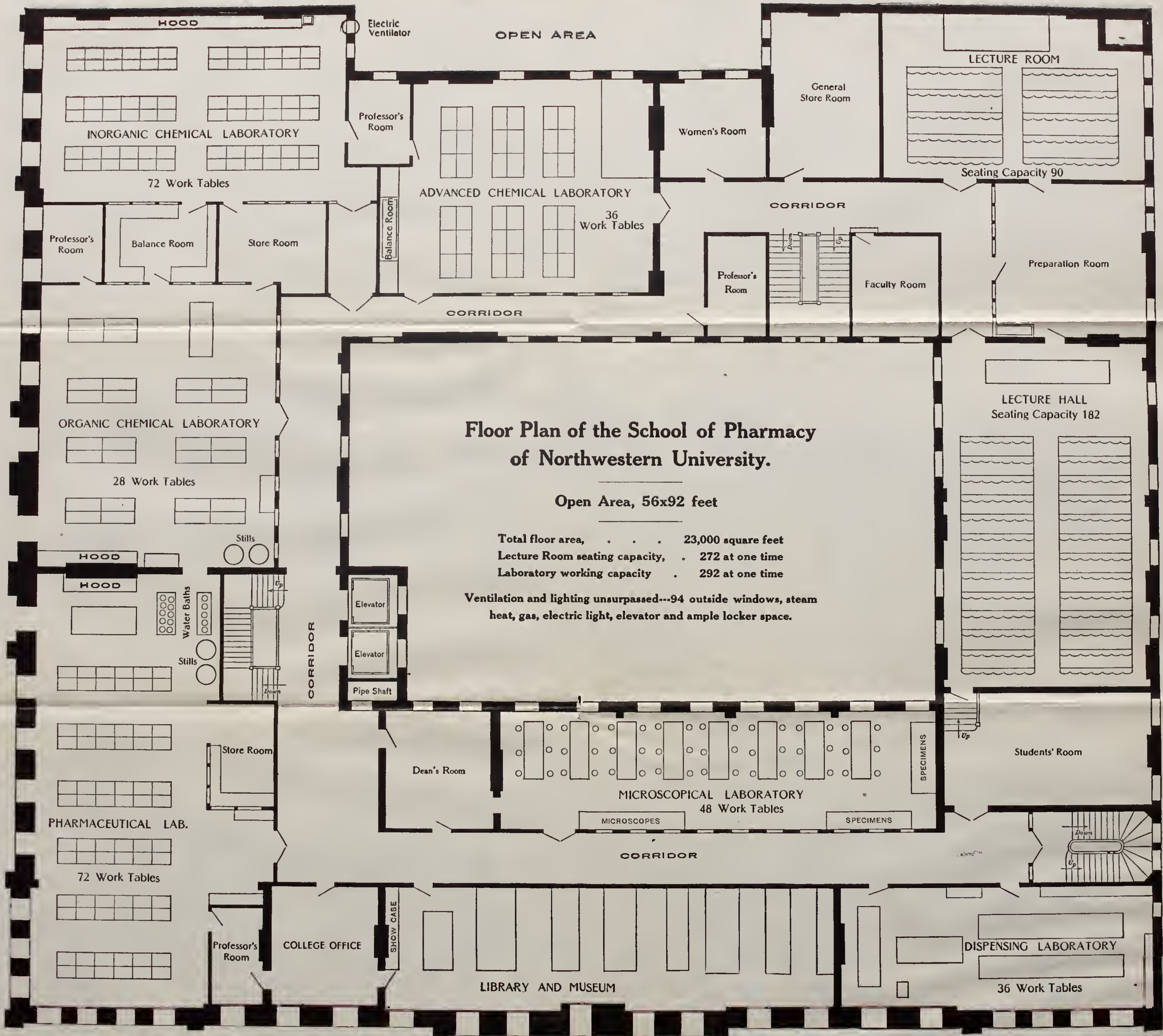
founded in 1907 at Evanston. The Swift Hall of Engineering will be completed 1908. Offers advanced courses in all branches of Engineering. For information address the President's Secretary, 87 Lake Street, Chicago.

Evanston and Chicago



Page
. . . . 2
. . . . 3
rsity 4
. . . . 4
. . . . 5
. . . . 6
. . . . 7
. . . . 8
. . . . 9
. . . . 10
aduate in
. . . . 15
aceutical
. . . . 19
. . . . 22
. . . . 25
. . . . 26
. . . . 28
. . . . 29
. . . . 30
. . . . 31



Floor Plan of the School of Pharmacy of Northwestern University.

Open Area, 56x92 feet

Total floor area, ...	23,000 square feet
Lecture Room seating capacity, .	272 at one time
Laboratory working capacity .	292 at one time

Ventilation and lighting unsurpassed---94 outside windows, steam heat, gas, electric light, elevator and ample locker space.

TABLE OF CONTENTS.

Page

Junior Program of Studies........................ 2

Senior Program of Studies........................ 3

Officers of the Corporation of Northwestern University.... 4

Executive Committee of the School of Pharmacy......... 4

School Calendar for 1908–1909.................... 5

Faculty of the School of Pharmacy.................... 6

Present Conditions in the Practice of Pharmacy.......... 7

Necessity for Laboratory Training.................... 8

Courses in Pharmacy............................ 9

Laboratory Courses in the School of Pharmacy...........10

Summary of the Courses for the Degree of Graduate in Pharmacy.................................15

Summary of the Courses for the Degree of Pharmaceutical Chemist 19

Food and Drugs Course..........................22

Advertisement of the School of Pharmacy..............25

Fees and Expenses..............................26

Officers of the Alumni Association..................28

Advertisement of Medical School...................29

Advertisement of Dental School....................30

Mailing Blank for Information......................31

Junior Program for the Year 1908-09

School Year begins September 28, 1908

		Pharmaceutical Chemist 9 months	Graduate in Pharmacy 6 months	Graduate in Pharmacy Part-time 9 mo.
MONDAY	10-11	Chemistry	Chemistry	Chemistry
	11-12	Chemistry	Chemistry	Chemistry
	1-2	Chemical Laboratory	Manufacturing Laboratory	Chemical Laboratory
	2-3			
	3-4			
TUESDAY	10-11	Pharmacy	Pharmacy	Pharmacy
	11-12	Chemistry	Chemistry	Chemistry
	1-2	Manufacturing Laboratory	Chemical Laboratory	Manufacturing Laboratory
	2-3			
	3-4			
WEDNESDAY	9-10	Pharm. Quiz.	Microscopical Laboratory	Pharm. Quiz.
	10-11	Chem. Quiz.		Chem. Quiz.
	11-12	Problems	Problems	Problems
	1-2	Microscopical Laboratory	Chemical Laboratory	X
	2-3			X
	3-4			X
THURSDAY	10-11	Pharmacy	Pharmacy	Pharmacy
	11-12	Problems	Problems	Problems
	1-2	Chemical Laboratory	Pharmaceutical Laboratory	Chemical Laboratory
	2-3			
	3-4			
FRIDAY	9-10	Botany	Botany	X
	10-11	Microscopical Laboratory	Chem. Quiz.	X
	11-12		Phar. Quiz.	X
	1-2	Chemical Laboratory	Microscopical Laboratory	Chemical Laboratory
	2-3			
	3-4			
SATURDAY	9-10	Physiology	Physiology	X
	10-11	Pharmaceutical Laboratory	Chemical Laboratory	Pharmaceutical Laboratory
	11-12			
	12-1			

Third column time-card arranged for students employed concurrently in Drug Stores. Hours marked X are vacant and the subjects for those hours are given in Spring term.

Senior Program for the Year 1908-09

		Pharmaceutical Chemist 9 months	Graduate in Pharmacy 6 months	Course in Food and Sanitary Analysis, 6 mo.
MONDAY	9-10	Materia Medica	Materia Medica	Hours arranged later.
	10-11	Dispensing	Pharmacognosy	
	11-12			
	1-2	Pharmacognosy	Dispensing	
	2-3			
	3-4	Problems	Phar. Quiz.	
	4-5			
TUESDAY	9-10	Dispensing and Comm'l Pharm.	Dispensing and Comm'l Pharm.	X
	10-11	Pharmacognosy	Dispensing	
	11-12			
	1-2	Dispensing	Pharmacognosy	
	2-3			
	3-4	Phar. Quiz.	Chem. Quiz.	
WEDNESDAY	9-10	Drug Assaying	Manufacturing Laboratory	X
	10-11			
	11-12			
	1-2	Pharmacy	Pharmacy	
	2-3	Drug Assaying	Manufacturing Laboratory	
	3-4			
	4-5			
THURSDAY	9-10	Materia Medica	Materia Medica	X
	10-11	Pharmacy	Pharmacy	
	11-12	Organic Chem.	Organic Chem.	
	1-2	Urine Analysis	Urine Analysis (optional)	
	2-3			
FRIDAY	9-10	Manufacturing Laboratory	Drug Assaying	X
	10-11			
	11-12			
	1-2	Organic Chem.	Organic Chem.	
	2-3	Manufacturing Laboratory	Drug Assaying	
	3-4			
	4-5			
SATURDAY	9-10	Urine Analysis	Urine Analysis (optional)	X
	10-11			
	11-12	Chem. Quiz. Accounting (optional)	Accounting (optional)	

Students in Graduate in Pharmacy Course have the option of taking Urine Analysis Thursday afternoon and Saturday morning or reserving those half days for relief work.

Officers of the Corporation of Northwestern University

WILLIAM DEERING,
Honorary President.

WILLIAM FRASER McDOWELL, D.D., LL.D.,
President.

OLIVER HARVEY HORTON, LL.D.,
First Vice-President.

HUMPHREYS HENRY CLAY MILLER, A.M.,
Second Vice-President.

FRANK PHILIP CRANDON, A.M.,
Secretary.

JOHN RICHARD LINDGREN,
Treasurer.

WILLIAM ANDREW DYCHE, A.M.,
Business Manager and Assistant Secretary.

Executive Committee of the School of Pharmacy

WILLIAM ANDREW DYCHE, A. M., PH. G.,
WILHELM BODEMANN,
HENRY SHERMAN MAYNARD,
THEODORE HENRY PATTERSON, M. D.,
CHARLES HAMILTON AVERY.

School Calendar for 1908-1909

1908.

Sept. 28th.—Registration Day for Juniors.

Sept. 29th.—Registration Day for Seniors.

Sept. 30th.—Laboratories open and Lectures begin.

Nov. 26th to 28th inclusive.—Thanksgiving Recess.

Dec. 20th to Jan. 3rd inclusive.—Christmas Recess.

1909.

April 5th to 8th.—Examinations in Graduate in Pharmacy Course.

April 12th.—Spring Term Begins.

April 15th.—Graduating Exercises of Graduates in Pharmacy.

May 24th to 27th.—Examinations of Candidates for the Degree of Pharmaceutical Chemist.

June 3d.—Annual Commencement.

June 17th.—Spring Term ends.

Faculty of the School of Pharmacy

1908–1909.

ABRAM WINEGARDNER HARRIS, SC.D., LL.D., *President of the University.*

OSCAR OLDBERG, PHARM. D., DEAN, *Professor of Pharmacy and Director of the Pharmaceutical Laboratories.*

WILLIAM EDWARD QUINE, M.D., LL.D., *Emeritus Professor of Physiology, Therapeutics and Toxicology.*

HARRY MANN GORDIN, PH.D., *Professor of Chemistry and Director of the Chemical Laboratories.*

MAURICE ASHBEL MINER, PHARM. M., *Assistant Professor of Pharmacy, in charge of the Manufacturing Laboratory. Curator.*

CHARLES WAGGENER PATTERSON, SC.B., PH.C., *Assistant Professor of Organic Analytical Pharmaceutical Chemistry, in charge of the Organic Chemical Laboratory.*

HARRY KAHN, PHARM. M., M.D., *Assistant Professor of Physiology and Materia Medica.*

EUGENE SHAW WILLARD, D.D.S., *Assistant Professor of Bacteriology.*

GERHARD H. JENSEN, PH.D., *Instructor in Botany and Pharmacognosy.*

GEORGE DANIEL OGLESBY, PH.G., *Instructor in Pharmacy. In charge of the Dispensing Laboratory.*

WILLIAM HENRY HARRISON, PH.C., *Instructor in the Chemical Laboratories.*

ERNEST WOOLLETT, *Instructor in Bookkeeping and Business Methods*, SECRETARY OF THE SCHOOL.

FERDINAND NITARDY, PH.C.. *Assistant in the Chemical Laboratories.*

BULLETIN
OF THE
SCHOOL OF PHARMACY
OF
NORTHWESTERN UNIVERSITY

JANUARY–MARCH, 1908.

PRESENT CONDITIONS IN THE PRACTICE OF PHARMACY

The most encouraging sign of improvement in the practice of pharmacy is the attitude of physicians toward proprietary medicinal preparations. The agents ("detail men") of the manufacturers of such preparations are not able to get the ear of the medical practitioner to the extent they did a year ago; medical journals that advertise nostrums are losing subscribers; and medical societies are exercising a rigid censorship over programs for their meetings. Nostrum makers who formerly gained admittance to many physicians find themselves excluded or confronted with embarassing questions and told not to come again. Meanwhile the exposure of calamitous results following the use of nostrums continues. No one thing has happened in the past fifty years to give an equal amount of encouragement to the true pharmacist whose worst enemy is quackery. The return to sane medication means the recognition of the services of competent pharmacists as indispensable to the safe use of medicines.

Self-medication which has grown to enormous proportions within a generation through the advertising of quack nostrums by manufacturers and vendors is one of the great evils of the day. There is no recourse for the public except rational dependence upon the services of the physician and the pharmacist.

The leaders of the reform, the more intelligent, competent and right-minded among physicians and pharmacists, will see clearly what is necessary for the ultimate success of the movement. Physicians and pharmacists alike must discountenance the use and sale of medicines for which superior merits are claimed unless sufficient proof of the character and composition is published. Physicians must abstain from practising pharmacy and pharmacists must abstain from prescribing. Both physicians and pharmacists must remember that ignorant and faithless men are to be found in all occupations; that victory in the war on ignorance and quackery depends upon the united efforts of the competent and honest, and that the end sought can not be attained without earnest and patient effort. Satisfactory standards of education must be our present aim, and pharmacists who oppose better education prevent the restoration of mutual confidence and respect between physicians and pharmacists. Fortunately the opposition disappears as the question becomes better understood.

NECESSITY FOR LABORATORY TRAINING

The pharmaceutical work of the drug store is the most desirable part of the druggist's business and the only feature of it which distinguishes him from other merchants. A store in which drugs and medicines are sold along with an incongruous assortment of other goods, and in which little or no pharmaceutical work is done may yield a satisfactory profit; but a drug store manned by competent pharmacists who put knowledge and skill to practical use in procuring proper drugs and medicines and in making all the preparations practicable renders a great service to the public. Expert specialists are able to contribute much to the value of medicines dispensed, and no one knows this better than the druggist himself.

Many of the pharmaceutical preparations ordered by physicians will always be made by manufacturers but a large share of pharmaceutical work still belongs to the pharmacist who is ambitious and competent.

All the work that properly belongs to the pharmacist is technical and is based upon scientific knowledge. For this reason special, scientific-technical training is necessary for the successful practice of pharmacy. Such a training is to be gained only in a well equipped and properly conducted pharmaceutical school where the practical work of the pharmacist is systematically taught by teachers with experience as practical pharmacists.

It has been demonstrated that the program of greatest practical benefit to the student of pharmacy embraces about thirty hours of instruction weekly, ten hours of lectures and recitations, and twenty hours of laboratory work. A less amount of instruction does not enable the student to use his time to the best advantage, and a materially increased number of hours devoted to lectures is apt to overtax the average student. The most important part of pharmaceutical education is the laboratory work.

The laws of New York make graduation from a satisfactory pharmacy school prerequisite to the license to practice. The State Board of Pharmacy of New York has ruled when a student of pharmacy attends a college in which the program of instruction occupies only three days weekly and which permits the remainder of his time to be spent as an employee in a drug store, that the store experience acquired in the six months thus divided between the college and the store may be counted as equal to 100 hours of work in the college laboratories. The total credit thus given is limited to 200 hours, and drug store experience other than that gained concurrently with the college is not counted as equivalent to any part of the prescribed college laboratory instruction.

COURSES IN PHARMACY

Courses in Pharmacy vary widely and are almost as numerous in kind as the schools giving them. Two systems prevail, that requiring the full time of students, and that requiring half time. The second system permits of concurrent employment in drug stores at compensation sufficient to pay for living expenses. Northwestern University offers the student his option of systems.

The course for Graduate in Pharmacy requires two years, of six months each, full time; or two years, of nine months each, to those employed in stores. The time card of the second system is arranged to permit employment on the days and at the hours when such service is most valuable. The student who is in a position to attend college without having to earn his living expenses should choose the full time program, and only those who must, should engage in outside work. The part time program, however, is designed to meet the necessities of those who must seek employment.

Courses at Northwestern University

1. Course for the degree of Graduate in Pharmacy occupying two years of six months each with the students whole time employed.
2. The same course extended through two years of nine months each for students who are concurrently employed in drug stores and are therefore unable to carry more than two-thirds of the weekly curriculum of studies.
3. The course for the degree of Pharmaceutical Chemist extending through two years of nine months each with the student's whole time fully employed.
4. The course for the Degree of Master of Pharmacy consisting of three years in the liberal arts courses and two years in the pharmaceutical courses.

THE LABORATORY COURSES IN THE SCHOOL OF PHARMACY OF NORTHWESTERN UNIVERSITY

THE GENERAL PHARMACEUTICAL LABORATORY

This laboratory occupies a room with 2,300 square feet of floor space and has individual accommodations for 288 students divided into sections of 72 each.

Each student taking the course for the degree of Graduate in Pharmacy receives 300 hours of instruction in this manufacturing laboratory, or two half-days weekly in each annual session of twenty-five weeks.

The work includes the study of materials, methods and apparatus employed in the preparation of medicines, and the making of a large variety of products selected with the view to give the laborant varied and instructive practice.

The preparations made are chiefly those of the Pharmacopœia and the National Formulary and each student prepares about 150 to 200 finished products in the two school years of fifty weeks. Inorganic and organic chemical compounds as well as galenical preparations are manufactured in this workshop, and chemical constituents of plant drugs are extracted and purified.

Candidates for the degree of Pharmaceutical Chemist have twenty-four additional laboratory periods of three hours each devoted to the preparation of organic chemical compounds.

Specimens of several hundred different preparations made by the classes are on exhibition at the School, demonstrating the ability of the students in this line of work.

At this time when physicians and pharmacists are so strongly advocating the use of the preparations of the U. S. P. and the N. F. in preference to proprietary specialties it is more than ever necessary that pharmacists should be thoroughly prepared to do this work.

THE GENERAL CHEMICAL LABORATORY

This laboratory has a floor space of 1800 square feet and individual accommodations for 216 students divided into three sections.

Each student receives 225 hours instruction in this laboratory in the first twenty-five weeks of his course.

The Pure Food and Drugs Laws recently enacted emphasize the necessity for a practical working knowledge of chemistry and the chemical examination of medicinal preparations.

The student receives his first introduction to practical chemical work in this laboratory. After a thorough study of the properties of the most important elements and some of their compounds he is taught the nature and use of chemical reagents, the best analytical methods are practiced, and a sufficient number of known and unknown substances are identified to give him a good grasp of qualitative analysis.

The qualitative work is followed by volumetric analysis.

The courses given in the General Chemical Laboratory are designed to fit the student to apply the tests employed for the detection of impurities in chemicals, pharmaceutical preparations and other products, to perform accurately volumetric determinations and to take up successfully the more advanced courses in qualitative chemistry.

Sufficient practice is afforded in the use of all the standard test solutions.

THE LABORATORY FOR INORGANIC GRAVIMETRIC ANALYSIS

The floor area of this laboratory is 1450 square feet and 108 students in three sections are here provided for.

The regular course embraces forty-five laboratory periods of three hours each.

The gravimetric work is that practiced by pharmaceutical, sanitary, industrial and other analytical chemists.

THE ORGANIC LABORATORY COURSES

The special laboratory for organic work has 1900 square feet of floor space and individual work tables for two classes each numbering 28 students.

The courses in this laboratory include special pharmaceutical testing and practice of the official assay processes for the preparations of opium, cinchona and nux vomica, advanced work in the valuation of drugs and other medicinal substances, in food and sanitary analysis, etc.

All students have fifty laboratory periods of three hours each in pharmaceutical testing and drug assaying in this laboratory and those taking the course for the degree of pharmaceutical chemist have sixty-nine additional laboratory periods of the same length.

URINE ANALYSIS

The course in Urine Analysis embraces forty laboratory periods of two hours each. It is a required course for the degree of Pharmaceutical Chemist and is open to all students as an optional course at a very moderate fee. This work is given in the laboratory for advanced inorganic analysis.

THE LABORATORY FOR BOTANY AND PHARMACOGNOSY

This laboratory has 1224 square feet of floor area and accommodates four classes of 48 students each.

Each student receives fifty laboratory periods of two and one-half hours each in this laboratory through his first annual school session of twenty-five weeks, and fifty laboratory periods of two hours each in the second year. Students taking the course for the degree of Pharmaceutical Chemist have fifty-four additional hours work devoted to Commercial Microscopy.

The student is taught the construction and use of the compound microscope. The best Leitz instruments with one inch and quarter inch objectives, two eye pieces, double nose-pieces, etc., are furnished to all students for the work in this laboratory.

The practical work in this laboratory is necessary to fit the student for intelligent interpretation and use of the pharmacopœial descriptions of vegetable drugs and for the identification of such drugs, whole or powdered, and gives him practice in modern methods of examination of their quality and purity.

THE DISPENSING LABORATORY

This work-room has a floor space of 900 square feet and is amply sufficient to enable the teacher to instruct from twenty to thirty students at a time, giving several lessons weekly to four or more sections of that number of individuals.

The regular course in this laboratory consists of fifty lessons of two hours each through twenty-five weeks. It is given in the senior year.

The School of Pharmacy of Northwestern University was the first of its kind to introduce laboratory courses of instruction in the art of dispensing. Before the advent of this School the dispensing laboratory was unknown and all instruction in dispensing was given by the lecture system. It was then assumed .that the drug stores must be depended upon to teach the practical work of dispensing.

It must be evident to those conversant with practical pharmacy that a well equipped special laboratory in which the classes are given adequate instruction by a thoroughly experienced practical pharmacist is one of the necessary means of imparting special training in the most important work which the pharmacist is called upon to do.

The dispensing laboratory is supplied with an outfit of implements and apparatus many times as extensive as can be found in any pharmacy. Each student is taught how to use these tools in a workmanlike fashion. Perfectly finished preparations such as are made at the dispensing table are shown for purposes of study and comparison. All the classes of such preparations are made by each student, and the prescriptions are prepared or selected with the view to give him the greatest possible variety of practical work.

From six to twelve examples or prescriptions are finished at each of the fifty lessons. Approximately 400 prescriptions are dispensed by each student.

Powders, pills, troches, capsules, triturates, compressed tablets, ointments, plasters, suppositories, bougies, emulsions, and a great variety of liquid mixtures are prepared. Incompatibilities and other prescription difficulties as well as all phases of manipulation are studied in the most practical and complete manner.

Probably each student sees and does a far greater variety of work in the course given him in the Dispensing Laboratory of this School than comes to an operator in any drug store in the course of several years. Thousands of prescriptions dispensed in a drug store do not present so great a variety of problems as a set of lessons constructed expressly to examplify the typical and exceptional phases occurring in actual practice.

Courses Given in the School of Pharmacy of Northwestern University

FOR THE DEGREE OF GRADUATE IN PHARMACY

First Year

PHARMACY

COURSE A. **Definition of Pharmacy.**—Its functions and problems.

The Pharmacopœia.—Its scope, objects and construction. Its drugs, chemicals and preparations. Pharmacopœial nomenclature.

Preparatory study of the various classes of Materials employed in the preparation of medicines.

General Pharmaceutical Processes and Manipulations.—Powdering, solution, filtration, evaporation, crystallization, precipitation, sublimation, distillation, maceration, digestion, percolation, etc.

General study of the various classes of **Pharmaceutical Preparations.**

Three hours weekly through twenty-five weeks.

PROFESSOR OLDBERG.

COURSE B. **Weights and Measures, and Pharmaceutical Arithmetic.**

The Metric System. Customary weights and measures. Specific Density.

Practice in the mathematical problems of pharmaceutical operations.

Two hours weekly through twenty-five weeks.

MR. OGLESBY.

COURSE C. **Laboratory Practice.**—Work designed to familiarize the student with apparatus, processes and materials and to apply practically the lessons taught in the didactic courses. This course in pharmaceutical and chemical operations includes the manufacture of a great variety of finished products.

Two laboratory periods weekly of three hours each through twenty-five weeks.

ASSISTANT PROFESSOR MINER.

CHEMISTRY

COURSE A. Lecture Courses in **General and Inorganic Chemistry**, theoretical and descriptive. Designed to lay the foundation necessary to the successful pursuit of the laboratory work and for the further courses in chemistry.

Three hours weekly through twenty-five weeks.

PROFESSOR GORDIN.

COURSE B. **Laboratory Work.**

1. Experiments in elementary chemistry. Study of the physical and chemical properties of the most common and important elements and their compounds.
2. Qualitative Analysis. Study of the methods of separation and identification of the principal bases and acids and the reactions involved. Analysis of substances and mixtures, the composition of which is unknown to the student. Practical application of the identity and purity tests of the Pharmacopœia.
3. Inorganic Quantitative Analysis, chiefly volumetric. Principles and Methods. Practice in the use of "standard volumetric test solutions."

About twenty-five recitations of an hour each, and

Seventy-five laboratory periods of three hours each.

PROFESSOR GORDIN,
MR. HARRISON.

PHARMACEUTICAL BOTANY AND MICROSCOPY

The organs, tissues and microscopical structure of plants and plant drugs. This course is the necessary preparations for the identification and study of vegetable drugs.

Twenty-five lectures of an hour each, and

Fifty laboratory periods of two and one-half hours each.

DR. JENSEN

HUMAN ANATOMY AND PHYSIOLOGY

A course of twenty-five lectures constituting the necessary introduction to the study of the action and uses of medicines.

ASSISTANT PROFESSOR KAHN.

Second Year

PHARMACY

COURSE D. **Applied Inorganic Pharmaceutical Chemistry.** The chemical preparations, their production and pharmacy.

Twenty-five lectures and recitations

PROFESSOR OLDBERG.

COURSE E. **Pharmaceutical Chemical Problems.**—Exercises in writing chemical equations, making stoechiometric calculations, etc. This course is supplemental to Course B.

Twenty-five recitations. MR. OGLESBY.

COURSE F. **The Special Pharmacy of Important Vegetable Drugs and their Preparations.**—Also the Preparations of the National Formulary.

Twenty-five lectures and recitations.

PROFESSOR OLDBERG.

COURSE G. **Extempore Operative Pharmacy.**—The prescription and its construction and interpretation. The dispensing department and its problems. Incompatibilities. Numerous selected prescriptions and formulas are analyzed and discussed.

Duties and responsibilities of pharmacists and their agents. Regulation of the practice of pharmacy in the United States. Relation of pharmacists to the medical profession and the public. Pharmaceutical ethics.

Twenty-five lectures and recitations.

PROFESSOR OLDBERG.

COURSE H. **Senior Laboratory Course.**—Practice in the manufacture of chemical and pharmaceutical preparations and in the extraction and purification of important natural constituents of plant drugs.

Fifty laboratory periods of three hours each.

ASSISTANT PROFESSOR MINER.

COURSE I. **Commercial Pharmacy.**—The practical details of daily work of a properly equipped and well conducted retail drug store. Miscellaneous medicinal and pharmaceutical preparations and sick room supplies furnished by pharmacists, such as sanitary and surgical preparations and appliances, dietic products, "druggists' sundries," etc. Their character, uses and proper preservation. Exhibits of these supplies are placed before the class.

Twenty-five lectures and class exercises of an hour each.

MR. OGLESBY.

COURSE J. **The Art of Dispensing.**—A practical laboratory course, accompanying lectures and recitations. It is now generally conceded that a systematic course of laboratory training in the art of making extemporaneous pharmaceutical preparations and in compounding and dispensing medicines must be a fundamental and crowning feature of any first-class School of Pharmacy. In the Dispensing Laboratory of the School of Pharmacy of Northwestern University (the first workshop of its kind) the student sees and learns to use an outfit of dispensing apparatus more extensive than can be found in many of the best drug stores together. Every student is required to make a great variety of extemporaneous preparations. The lessons are systematically selected to include all important phases of work at the dispensing table with all kinds of materials and by all the different methods practiced. A practical experimental study of incompatibilities is included in this course.

Over 400 different instructive prescriptions are prepared by each student in this laboratory.

About one hundred hours of laboratory drill.

MR. GEORGE D. OGLESBY.

COURSE K. **Business Training.** A course of class exercises designed to teach the student book-keeping and other essential methods of conducting the business affairs of a drug store.

About fifteen hours. MR. WOOLLETT.

CHEMISTRY

COURSE C. **Lecture Course in Organic Chemistry.** The principles of the chemistry of the combustible carbon compounds. Their structure and classification. Organic substances important to pharmacy and medicine are given special attention. A course intended to prepare the student to understand the text of the Pharmacopoeia descriptive of the organic chemicals, alkaloids, volatile oils, etc., and to fit him to pursue intelligently the work in drug assaying, organic pharmaceutical testing, the production of organic chemical preparations and other practical work related to organic chemistry.

Three hours weekly through twenty-five weeks.

PROFESSOR GORDIN.

COURSE D. **Drug Assaying and Organic Pharmaceutical Testing.** Pharmacopoeial processes of valuation and standardization of the most important drugs and preparations, such as opium, cinchona, nux vomica, etc.

Practice in the application of the purity tests prescribed in the Pharmacopoeia, and in the quantitive examination of important chemical preparations by the official methods. The determination of alcohol in tinctures, fluid extracts and other alcoholic preparations and the valuation of pepsin, pancreatin, diastase preparations, etc.

Forty-eight laboratory periods of three hours each

ASSISTANT PROFESSOR PATTERSON.

PHARMACOGNOSY

About two hundred of the most important drugs are thoroughly studied. A special effort is made to develop a capacity to intelligently interpret and apply the pharmacopoeial description for the identification of drugs and to form a correct judgment of their quality.

Fifty laboratory periods of two hours each. DR. JENSEN.

MATERIA MEDICA

The properties, action, uses and doses of drugs and medicines including so much of therapeutics and toxicology as is indispensable to the intelligent and safe practice of pharmacy.

Fifty lectures through twenty-five weeks.

ASSISTANT PROFESSOR KAHN.

The course in Urine Analysis is also offered to students Registered for the degree of Graduate in Pharmacy and may be taken by them in their second year.

COURSES FOR THE DEGREE OF PHARMACEUTICAL CHEMIST

All the courses required for the degree of Graduate in Pharmacy constitute a part of the curriculum required for the degree of Pharmaceutical Chemist. The following courses are required in addition:

First Year

PHARMACY

COURSE K. The general lessons taught by a comparison of the principal pharmacopoeias of other countries with the Pharmacopoeia of the United States. The scope, style of construction, materia pharmaceutica, nomenclature, preparations and other important general features of foreign pharmacopoeias.

Discussion of miscellaneous products not treated of elsewhere which are made or supplied by pharmacists, including sanitary preparations, soaps, perfumery, etc.

About nine lectures.

PROFESSOR OLDBERG.

CHEMISTRY

COURSE E. Gravimetric Analysis.

Fundamental operations characteristic of the general method and special processes employed in the actual gravimetric determination of inorganic substances.

Forty-five laboratory periods of three hours each.

PROFESSOR GORDIN,
MR. HARRISON.

Course D. This first course in drug assaying and pharmaceutical testing, as described among the second year courses in chemistry for the degree of Graduate in Pharmacy, is taken by the candidates for the degree of Pharmaceutical Chemist in the latter part of the first year's work.

Second Year

CHEMISTRY

Course F. **Special lectures upon important chemical constituents** of plant drugs such as alkaloids, glucosides, etc., and upon certain important features of chemical physics including the use of the polariscope and other instruments in chemical work.

About twelve lectures. Professor Gordin.

Course G. **Organic Chemical Preparations.**—A laboratory course in making organic chemical compounds illustrating general methods.

Twenty-four laboratory periods of three hours each.

Assistant Professor Miner.

Course H. **Urine Analysis, Qualitative and Quantitative.** The detection and determination of constituents of urine which are of importance in the diagnosis of disease.

Twenty-six laboratory periods of three hours each.

Assistant Professor Patterson.

Course I. **Advanced Course in Drug Assaying and Pharmaceutical Testing.** Further practice in the quantitative estimation of drugs and preparations containing alkaloids, and the examination of volatile oils and various other pharmaceutical and industrial products. Practice in the determination of melting points and boiling points. Other laboratory methods employed in similar work.

One hundred and forty-four hours of laboratory work with accompanying lectures.

Course J. **Food and Sanitary Analysis.**—The examination of water to determine its potableness and fitness for household uses, the examination of milk, butter, and food products generally, and such other work required of public analysts for sanitary purposes.

Twenty-four laboratory periods of three hours each.

Assistant Professor Patterson.

COMMERCIAL MICROSCOPY

A course designed to train the student for the duties of the pharmaceutical chemist and public microscopist in the examination of powdered drugs, spices, food products, etc.

The course includes work with the camera lucida and the polariscope.

Eighteen laboratory periods of three hours each.

DR. JENSEN.

SPECIAL POST-GRADUATE COURSE FOR FOOD AND DRUGS CHEMISTS AND INSPECTORS

The course for the degree of Pharmaceutical Chemist, occupying two years of nine months each, offers thorough training for service under the recently enacted Food and Drugs Law of the United States, and under state and municipal laws of similar character.

In addition, a post-graduate course is offered to graduates of this school and to the graduates of other schools who have had the necessary preliminary work in chemistry and other branches, covering one additional school year of six months. It offers an alternative plan for students of this school to complete the course for the degree of Pharmaceutical Chemist by giving the work in three years of six months each instead of in two years of nine months. Graduates who have had two years' courses, embracing at least fifty weeks. with not less than twelve hundred hours' instruction in pharmacy, chemistry and pharmacognosy, will be admitted to this course. The course is offered in response to the many inquiries received from graduates in pharmacy and others who desire to fit themselves for positions in national, state and municipal laboratories or for positions in the laboratories of manufacturers and wholesale establishments.

The course has been most carefully arranged to be in every detail fully adapted to the requirements of the National Bureau of Chemistry and to the practical work demanded.

The subjects included are as follows:

1. Laboratory course in Inorganic Analysis. Practical work in general and special processes employed for the determination of the composition of inorganic substances by gravimetric methods

Nine hours weekly through twelve weeks.

Professor Gordin and Mr Harrison.

2. Lectures on chemical physics including the use of the polariscope and other physical instruments in chemical work.

Lectures on alkaloids, glucosides and other important natural constituents of drugs; their character, composition, separation, identification and quantitative determination.

Lectures on the chemistry of the organic synthetic compounds employed in medicine.

Two hours weekly through twenty weeks.

PROFESSOR GORDIN.

3. Important Unofficial Products and Preparations (not contained in the Pharmacopœia of the United States).

Two lectures weekly through five weeks.

PROFESSOR OLDBERG.

4. Laboratory course in the preparation of organic chemical compounds, such as ethers, chloroform, iodoform, nitrobenzine, acetanilide and various other organic substances used in medicine, and the production of a number of important natural plant substances, such as glucosides and other neutral principles. volatile oils, alkaloids, etc. Nine hours weekly through twelve weeks.

ASSISTANT PROFESSOR MINER.

5. Pharmaceutical Testing. Practice in the quantitative estimation of drugs and preparations containing alkaloids, and the examination of volatile oils and various other pharmaceutical and industrial products. Practice in the determination of melting points and boiling points. Toxicological examinations. Other laboratory methods employed in similar work.

Twelve hours' laboratory work weekly through twelve weeks with accompanying lectures.

ASSISTANT PROFESSOR PATTERSON.

6. Food and Sanitary Analysis. The examination of common food products and of water, milk, butter, fats and oils, baking powders, beverages, flavoring extracts, sugars and syrups, candies, ice-cream, etc. The analysis of water to determine its potableness and its fitness for household use.

Twelve hours of laboratory practice weekly through thirteen weeks with accompanying lectures and recitations.

ASSISTANT PROFESSOR PATTERSON.

7. Laboratory course in Commercial and Sanitary Microscopy. Examination of powdered drugs, spices, starches, foodstuffs, hairs, textile fibers, etc.

Nine hours weekly through thirteen weeks. DR. JENSEN.

8. Bacteriology.* The work usually required for sanitary purposes.

Nine hours weekly through thirteen weeks.

ASSISTANT PROFESSOR WILLARD.

9. Urine Analysis, Qualitative and Quantitative.* The detection and determination of constituents of urine which are of importance in the diagnosis of disease.

Six hours weekly through thirteen weeks.

ASSISTANT PROFESSOR PATTERSON.

The time card of instruction will be so arranged that those who require or desire to review Organic Chemistry may attend the full lecture course on that subject, occupying two hours weekly from September to April, without additional charge. This review is recommended.

Students who have completed these courses and who fulfil all other requirements may receive the degree of Pharmaceutical Chemist.

The total tuition fee, including materials, for this special post-graduate course is $120. A laboratory deposit of $10 is required to cover breakages.

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*Students have their choice of Bacteriology or Urine Analysis in registering for the Special Post-Graduate Course. An additional fee of $5.00 is required of those who register for the course in Bacteriology.

The School of Pharmacy of Northwestern University

University founded 1851. The School of Pharmacy established 1886.

Property and endowments of the University over $9,000,000; Faculties, 358; Libraries, 210,627. Students in 1908 numbered 4,036. Equipment of the School of Pharmacy, over $25,000; average annual attendance for the past six years, over 200.

Largest staff of teachers, devoting all their time to students of pharmacy. One-half of those teachers have had from 18 to 46 years' active connection with pharmacy and pharmaceutical education.

The School has six completely equipped laboratories for the exclusive use of its own students, with individual work tables, enabling 92 students to be all at work at the same time. The students spend two-thirds of their time (20 hours weekly) in these practical workshops.

Alumni now number 1670.

The Courses occupy two years.

Of the candidates for degrees who entered Northwestern University during the past twelve months, ten per cent had more or less college work to their credit, forty per cent of them were high school graduates, and the remainder had completed one, two or three years of high school work.

It is the ambition of the Faculty of this School to make it in every way an efficient practical training school for pharmacists.

The Courses begin September 28, 1908.

Positions for Graduates.—The demand for graduates of this School to occupy good positions is at all times greater than the supply. For some years past every graduate has been engaged before graduation day.

The occupations open to the alumni include: The drug business, wholesale and retail; professional pharmacy; positions as pharmacists in the Army and Navy and the Public Health and Marine-Hospital Service; hospital pharmacists; work as commercial and sanitary public analysts, and in the establishments of manufacturing pharmacists and chemists. Over twenty of the alumni have become teachers in pharmaceutical and medical schools.

Northwestern University School of Pharmacy is a member of the AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES, and is recognized in all states where any standards of efficiency have been established by law or by the Boards of Pharmacy.

FEES AND EXPENSES

Fees for the course leading to the degree of Graduate in Pharmacy.

FIRST YEAR.		SECOND YEAR.	
Matriculation	$ 5.00	Laboratory Deposit	$ 15.00
Laboratory Deposit	15.00	Tuition and Materials	100.00
Tuition and Materials	100.00	Diploma Fee	10.00
Total	$120.00	Total	$125.00

Extra fee for the additional Courses leading to the degree of Pharmaceutical Chemist.

FIRST YEAR.		SECOND YEAR.	
Tuition and Materials	$40.00	Tuition and Materials	$40.00

Laboratory Deposits are to cover breakage of apparatus in charge of students. All unexpended portions are refunded after deducting $3.00 each year for wear and tear of equipment.

Certain indispensable articles (not materials consumed) are necessarily furnished by the school for the convenience of students and to render the work effective and orderly. These articles include for example, note books, drawing books, dissecting needles for use in the microscopical laboratory, aprons and sleeves, additional pieces of apparatus required to replace those broken or lost, etc. A coupon ticket to the amount of $5.00 is used for the purpose of procuring these articles as needed. Supplies of this kind are issued in no other way. Unused coupons are redeemed at the end of the year or whenever the student discontinues his attendance.

No tuition or other fees are refunded except in case of the student's illness. In that case, if the student presents a certificate from a physician that he is unable to remain in attendance, and a statement from the Dean of the School that he is in good standing, one-half of the current semester's fees will be refunded, provided application is made before the middle of the semester.

BOARD AND ROOM.—Good board and room together can be secured near the school at from $4 to $6 per week. Students may also secure rooms and board separately. Information in regard to these matters and addresses of reliable and satisfactory private boarding places and furnished rooms will be supplied at the College. Good accommodations are plentiful, and satisfactory arrangements can be quickly made by each student immediately upon his arrival.

Students who are strangers to the city are, if desired, met upon their arrival and given every courtesy by the Northwestern University School of Pharmacy Secretary of the Y. M. C. A. and his aids, who have permanent offices in Northwestern University Building.

(See page 31.)

For further information address the Dean of
The School of Pharmacy, Northwestern University Building,
87 Lake Street, Chicago.

Officers of the Alumni Association of the School of Pharmacy of Northwestern University

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President,	Charles A. Storer	'88
First Vice-President,	William H. Harrison	'03
Second Vice-President,	George C. Hansen	'05
Third Vice-President,	Ralph H. Smith	'94
Treasurer,	Henry F. Schaper	'93
Secretary,	George D. Oglesby	'91
Trustees,	Henry F. Hauth	'07
	Otto R. Peters	'08
	Joseph F. Dvorak	'08

Northwestern University Medical School

Founded as the Chicago Medical College in 1859.

ARTHUR R. EDWARDS, A. M., M. D., Dean.

The Medical School is centrally located. Students have access to seven large hospitals in the immediate vicinity. Clinical material is abundant. The laboratories and lecture rooms are commodious, are well lighted, and are supplied with all modern appliances necessary to the effective study of medicine.

The full course consists of four years of eight months each. The Summer School begins June 1, 1908. First semester begins October 6, 1908.

Classes are divided into small sections. Individual instruction, a graded curriculum, and abundant clinical practice characterize the work in all departments.

Northwestern University graduates have taken first place before the different State Boards in the percentage of those successful in passing examinations.

For further particulars address the Secretary,

CHARLES LOUIS MIX, M. D.,
2431 Dearborn Street,
CHICAGO.

Northwestern University Dental School

Offers exceptional advantages to young men and women for the study of dentistry. While great attention is paid to the teaching of technic and theory, practical instruction to develop operative skill and dexterity and quick diagnostic judgment is not overlooked. The graduates of this School are admitted to examination for practice in every state.

The Faculty is composed of a large staff of experienced teachers, with Dr. G. V. Black, of world-wide reputation, as the dean.

The equipment and apparatus of the School are especially designed for the successful teaching of modern dentistry. Its large clinic rooms for operative and prosthetic dentistry are unequaled anywhere. The opportunities offered students for special preparation to enter independent practice are not exceeded by any other school.

Advanced students are permitted to remain in school under clinical instructors during the months intervening between the regular annual courses, the great clinics being open continuously the year round.

For the accommodation of practitioners who desire to obtain instruction in the more recent methods and materials employed in dental practice, this School conducts a POST GRADUATE COURSE during the month of June, each year.

The school year covers thirty-two weeks of six days in each, of actual teaching. The next annual session begins October 6, 1908.

For further information, address

DR. C. R. E. KOCH, Secretary
Northwestern University Bldg.
CHICAGO.

Tear out this page and mail to the School of Pharmacy of Northwestern University, 87 Lake Street, Chicago.

Send specific information regarding qualifications for entrance to the School of Pharmacy of Northwestern University.

Age...........

General Education..

Remarks..

....

Signed...

Address...

University Directory

ABRAM WINEGARDNER HARRIS,
Sc. D., LL. D., President

❡ Special announcements of the several departments of the University may be had on application. Address inquiries to the following:

College of Liberal Arts - - The Registrar
University Hall, Evanston

Medical School - - - The Secretary
2421-2437 Dearborn Street, Chicago

Law School - - - - The Secretary
Northwestern University Building, Chicago

School of Pharmacy - - - The Registrar
Northwestern University Building, Chicago

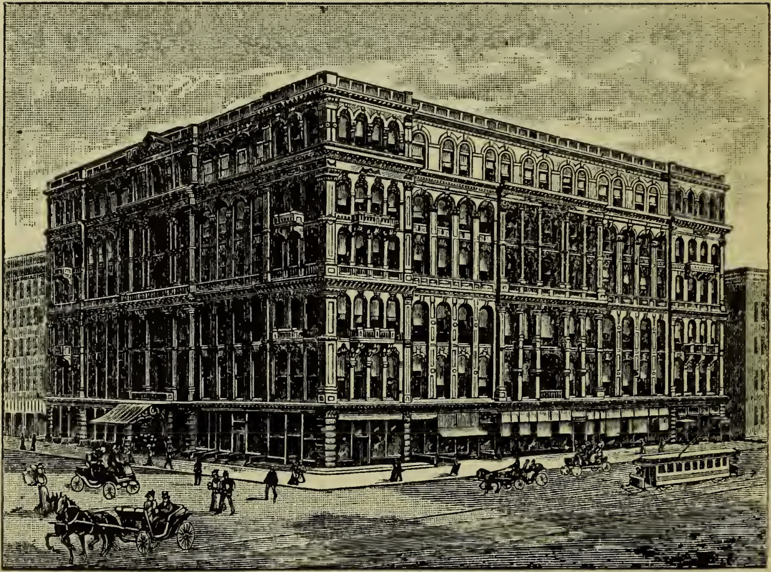
Dental School - - - The Secretary
Northwestern University Building, Chicago

School of Music - - - The Secretary
Music Hall, Evanston, Illinois

School of Engineering - - The Registrar
University Hall, Evanston

Evanston Academy - - - - Evanston
Arthur Herbert Wilde, Ph. D., Principal

For general information address the President
87 Lake Street, Chicago, Illinois



NORTHWESTERN UNIVERSITY BUILDING

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Northwestern University

QUARTERLY BULLETIN OF THE

SCHOOL of PHARMACY

THE LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

Vol. VII No. 1
October to December 1908

Next School Year Begins
September 27, 1909

NORTHWESTERN UNIVERSITY BUILDING
LAKE AND DEARBORN STREETS, CHICAGO

Entered June 24, 1902, at Chicago, Illinois, as Second-Class Matter, under Act of Congress of July 16, 1894.

1851

Northwestern University

THE location of Northwestern University, in and near a large city, and its property valued at $9,000,000, afford advantages that cannot be excelled.

THE COLLEGE OF LIBERAL ARTS
located at Evanston, in an ideal college community, offers preparation for business, the professions, and for pursuits requiring broad training.

THE MEDICAL SCHOOL
is one of the oldest, largest, and best equipped. Seven hospitals are open to students. Clinic material is abundant.

THE LAW SCHOOL
the oldest law school in Chicago, offers unexcelled library facilities and special courses that prepare for immediate practice in any state upon graduation.

THE COLLEGE OF ENGINEERING
founded in 1907 at Evanston. Swift Hall of Engineering completed in 1908. Offers advanced courses in all branches of Engineering.

THE SCHOOL OF PHARMACY
offers a scientific training in pharmacy, chemistry and drug and food analysis. Laboratory equipment the best.

THE DENTAL SCHOOL
offers expert training in theory and practice. Facilities are unsurpassed. Its clinic is the largest in the world.

THE SCHOOL OF MUSIC
affords a scientific preparation for music as an accomplishment and a profession. It is located at Evanston.

THE SCHOOL OF COMMERCE
offers University courses in accounting, banking, and business principles. Located in the business center of Chicago.

Evanston and Chicago

Officers of the Corporation of Northwestern University

William Deering
Honorary President

William Fraser McDowell, D.D., LL.D.
President

Oliver Harvey Horton, LL.D.
First Vice-President

Humphreys Henry Clay Miller, A.M.
Second Vice-President

Frank Philip Crandon, A.M.
Secretary

John Richard Lindgren
Treasurer

William Andrew Dyche, A.M.
Business Manager and Assistant Secretary

Executive Committee of the School of Pharmacy

William Andrew Dyche, A.M., Ph.G.
Wilhelm Bodemann
Henry Sherman Maynard
Theodore Henry Patterson, M.D.
Charles Hamilton Avery

Calendar for 1908-1909 School Year

1908

Nov. 26th to 28th inclusive.—Thanksgiving Recess.

Dec. 20th to Jan. 3rd inclusive.—Christmas Recess.

1909

April 6th.—Examinations Begin, Graduate in Pharmacy Course.

April 12th.—Instruction Resumed.

April 14th.—Graduating Exercises for Graduates in Pharmacy.

May 31st.—Examinations Begin, Candidates for the Degree of Pharmaceutical Chemist.

June 9th.—Annual Commencement.

June 18th.—End of First Year Courses for the Degree of Pharmaceutical Chemist.

Except in unusual cases students desiring the complete course leading to the degree of *graduate in pharmacy* or the degree of *pharmaceutical chemist* must begin their school work with the school year, in September.

Needed information of any sort, not contained in this Bulletin, as to the School's work, will be promptly supplied by the Administrative Officer through correspondence or by interview at Northwestern University Building, Lake and Dearborn Sts., Chicago, on any business day from 8:00 a. m. to 5:30 p. m.

Faculty of the School of Pharmacy

1908-1909

ABRAM WINEGARDNER HARRIS, SC.D., LL.D., *President of the University.*

OSCAR OLDBERG, PHARM. D., DEAN, *Professor of Pharmacy and Director of the Pharmaceutical Laboratories.*

THOMAS VICTOR WOOTEN, PH.G., *Administrative Officer.*

WILLIAM EDWARD QUINE, M.D., LL.D., *Emeritus Professor of Physiology, Therapeutics, and Toxicology.*

HARRY MANN GORDIN, PH.D., *Professor of Chemistry and Director of the Chemical Laboratories.*

MAURICE ASHBEL MINER, PHARM. M., *Assistant Professor of Pharmacy, in charge of the Manufacturing Laboratory. Curator.*

CHARLES WAGGENER PATTERSON, SC.B., PH.C., *Assistant Professor of Organic Analytical Pharmaceutical Chemistry, in charge of the Organic Chemical Laboratory.*

HARRY KAHN, PHARM. M., M.D., *Assistant Professor of Physiology and Materia Medica.*

EUGENE SHAW WILLARD, D.D.S., *Assistant Professor of Bacteriology.*

GERHARD H. JENSEN, PH.D., *Instructor in Botany and Pharmacognosy.*

WILLIAM HENRY HARRISON, PH.C., *Instructor in the Chemical Laboratories.*

JOHN FERDINAND FISCHNAR, PH.C., *Instructor in Pharmacy, in charge of the Dispensing Laboratory.*

ERNEST WOOLLETT, *Instructor in Accounting and Business Methods.*

JAMES LEWIS CLAY, PH.C., *Assistant in the Chemical Laboratories.*

Courses Given in the School of Pharmacy of Northwestern University

FOR THE DEGREE OF GRADUATE IN PHARMACY

First Year

PHARMACY

Professor Oldberg, Assistant Professor Miner and Mr. Fischnar

Definition of Pharmacy.—Its functions and problems.

The Pharmacopoeia.—Its scope, objects and construction. Pharmacopœial nomenclature.

Preparatory study of the various classes of **Materials** employed in the preparation of medicines.

General Pharmaceutical Processes and Manipulations.

General Study of the Various Classes of Pharmaceutical Preparations.

Weights and Measures, and Pharmaceutical Arithmetic.

Laboratory Practice.—Work designed to familiarize the student with apparatus, processes and materials, and to apply the lessons taught in the didactic courses. This course includes the manufacture of a great variety of finished products.

CHEMISTRY

Professor Gordin, Assistant Professor Patterson, and Mr. Harrison

Lecture Courses in **General and Inorganic Chemistry,** theoretical and descriptive.

Laboratory Work in elementary chemistry and in Qualitative and Quantitative Analysis.

PHARMACEUTICAL BOTANY AND MICROSCOPY

Dr. Jensen

The organs, tissues, and microscopical structure of plants and plant drugs.

HUMAN ANATOMY AND PHYSIOLOGY

Assistant Professor Kahn

A necessary introduction to the study of the action and uses of medicines.

Second Year

PHARMACY

Professor Oldberg, Assistant Professor Miner, Mr. Harrison and Mr. Fischnar

Applied Inorganic Pharmaceutical Chemistry. The chemical preparations, their production and pharmacy.

Pharmaceutical Chemical Problems.—Exercises in writing chemical equations, making stoechiometric calculations, etc.

The Special Pharmacy of Important Vegetable Drugs and their Preparations.

Extempore Operative Pharmacy.—The prescription and its construction and interpretation. The dispensing department and its problems. Incompatibilities.

Duties and responsibilities of pharmacists and their agents.

The practical details of daily work of a properly equipped and well conducted retail drug store. Miscellaneous medicinal and pharmaceutical preparations and sick room supplies furnished by pharmacists.

Senior Laboratory Course.—Practice in the manufacture of chemical and pharmaceutical preparations and in the extraction and purification of important natural constituents of plant drugs.

The Art of Dispensing.—A practical laboratory course accompanying the lectures and recitations.

Business Training.—A course designed to teach the student book-keeping and other essential business methods employed in the retail drug store.

CHEMISTRY

Professor Gordin and Assistant Professor Patterson

Lecture Course in Organic Chemistry.—The principles of the chemistry of the combustible carbon compounds.

Laboratory Course in Drug Assaying and Organic Pharmaceutical Testing.

PHARMACOGNOSY

Dr. Jensen

About two hundred of the most important drugs are thoroughly studied.

MATERIA MEDICA

Assistant Professor Kahn

The properties, action, uses, and doses of drugs and medicines including therapeutics and toxicology.

The course in Urine Analysis is also offered to students Registered for the degree of Graduate in Pharmacy and may be taken by them in their second year.

COURSES FOR THE DEGREE OF PHARMACEUTICAL CHEMIST

All the courses required for the degree of Graduate in Pharmacy constitute a part of the curriculum required for the degree of Pharmaceutical Chemist. The following courses are required in addition:

First Year

PHARMACY

Professor Oldberg

The general lessons taught by a comparison of the principal pharmacopoeias of other countries with the Pharmacopoeia of the United States.

CHEMISTRY

Professor Gordin and Mr. Harrison

Gravimetric Analysis.—Fundamental operations characteristic of the general method and special processes employed in the actual gravimetric determination of inorganic substances.

The course in drug assaying and pharmaceutical testing, as described among the second year courses in chemistry for the degree of Graduate in Pharmacy, is taken by the candidates for the degree of Pharmaceutical Chemist in the latter part of the first year.

Second Year

CHEMISTRY

Professor Gordin and Assistant Professors Miner and Patterson

Special lectures upon important chemical constituents of plant drugs such as alkaloids, glucosides, etc., and upon certain important features of chemical physics including the use of the polariscope and other instruments in chemical work.

Organic Chemical Preparations.—A laboratory course.

Urine Analysis, Qualitative and Quantitative.

Advanced Course in Drug Assaying and Pharmaceutical Testing.

Food and Sanitary Analysis.

SPECIAL POST-GRADUATE COURSE FOR FOOD AND DRUGS CHEMISTS AND INSPECTORS

The course for the degree of Pharmaceutical Chemist, occupying two years of nine months each, offers thorough training for service under the recently enacted Food and Drugs Law of the United States, and under state and municipal laws of similar character.

A post-graduate course, covering one additional school year of six months, is also offered to graduates of this School and of other schools who have had the necessary preliminary work in chemistry and other branches. It offers an alternative plan for students of this School to complete the course for the degree of Pharmaceutical Chemist by giving the work in three years of six months each instead of in two years of nine months each.

Graduates who have had courses, embracing at least fifty weeks, with not less than twelve hundred hours' instruction in pharmacy, chemistry, and pharmacognosy, will be admitted to this course. The course is offered in response to many inquiries received from graduates in pharmacy and others who desire to fit themselves for positions in national, state, and municipal laboratories or for positions in the laboratories of manufacturers and wholesale establishments.

The total tuition fee, including materials, for this special post-graduate course is $120. A laboratory deposit of $10 is required to cover breakage.

PARTIAL COURSES

Special students not candidates for graduation may be admitted by special action of the Faculty.

A student may be given one or more of the separate courses at proportional fees, and will receive full credit for work when satisfactorily done. This applies both to the didactic courses and to laboratory work.

ADVANCED CREDITS

A student presenting proper evidence of having satisfactorily completed in an approved school courses of study or laboratory work included in the curriculum of this School may receive such credit therefor as is consistent with the prescribed requirements.

The School of Pharmacy of Northwestern University

University founded 1851. The School of Pharmacy established 1886.

Property and endowments of the University over $9,000,000; Faculties, 358; Libraries, 210,627. Students in 1908 numbered 4,086. Equipment of the School of Pharmacy, over $25,000; average annual attendance for the past six years, over 200.

Largest staff of teachers, devoting all their time to students of pharmacy. One-half of those teachers have had from 19 to 47 years active connection with pharmacy and pharmaceutical education.

The School has six completely equipped laboratories for the exclusive use of its own students, with individual work tables, enabling 300 students to work at the same time. The students spend two-thirds of their time (20 hours weekly) in these practical workshops.

Alumni number 1,670.

The courses occupy two years.

Of the candidates for degrees who entered The School of Pharmacy during the past twelve months, ten per cent had some college work to their credit, forty per cent were high school graduates, and the remainder had completed one, two, or three years of high school work.

It is the ambition of the Faculty of this School to make it in every way an efficient practical training school for pharmacists.

The annual courses begin September 27, 1909.

Positions for Graduates.—The demand for graduates of this School is at all times greater than the supply. For some years past every graduate has been engaged before graduation day.

The occupations open to the alumni include: The drug business, wholesale and retail; professional pharmacy; positions as pharmacists in the Army and Navy and the Public Health and Marine-Hospital Service; hospital pharmacists; work as commercial and sanitary public analysts, and in the establishments of manufacturing pharmacists and chemists. Over twenty of the alumni have become teachers in pharmaceutical and medical schools.

FEES AND EXPENSES

Fees for the course leading to the degree of Graduate in Pharmacy.

First Year		Second Year	
Matriculation	$ 5.00	Laboratory Deposit	$ 10.00
Laboratory Deposit	10.00	Tuition and Materials	100.00
Tuition and Materials	100.00	Diploma Fee	10.00

Extra fee for the additional courses leading to the degree of Pharmaceutical Chemist:

Tuition and Materials $40.00 each year.

Laboratory Deposits are to cover breakage of apparatus in charge of students. All unexpended portions are refunded after deducting $3.00 each year for wear and tear of equipment.

Certain indispensable articles (not materials consumed) are necessarily furnished by the school for the convenience of students and to render the work effective and orderly. These articles include for example, note books, drawing books, dissecting needles for use in the microscopical laboratory, aprons and sleeves, additional pieces of apparatus required to replace those broken or lost, etc. A coupon ticket for $5.00 is issued for these articles. Supplies of this kind are issued in no other way. Unused coupons are redeemed at the end of the year or whenever the student discontinues his attendance.

Board and Room.—Good board and room together can be secured near the school at from $4 to $6 per week. Students may also secure rooms and board separately. Information in regard to these matters and addresses of reliable and satisfactory private boarding places and furnished rooms will be supplied at the School. Good accommodations are plentiful, and satisfactory arrangements can be quickly made by each student immediately upon his arrival.

Students who are strangers in the city will be assisted by the Administrative Officer in every way possible to secure suitable accommodations at the price they want to pay, special attention being given to wholesome moral surroundings.

Graduates in 1908

Degree of Pharmaceutical Chemist

James Lewis Clay	Chicago
Joseph Thomas Dvorak	Owatonna, Minn.
Albert George Eichler	Hampshire
Oscar A. Grulke	Atlantic, Iowa
Loren M. Haeseler	Lisbon
John Elwood Howell	Sioux Falls, S. D.
Eugene O. Leonard	Pocatello, Idaho
Herbert Samuel McDill	Port Neches, Texas
Ferdinand Wilhelm Nitardy	Owatonna, Minn.
Herschel Edwards Potter	Piggott, Ark.
Forrest Raymond Robertson	Houston, Texas
Felix Cajulis Samedra	Philippine Islands
Emmett B. Switzer	Albany
Louis Richard Wernecke	Winnetka

Degree of Graduate in Pharmacy

Roy M. Bergen	Petersburg
Friedrich Wilhelm Blomenkamp	Hastings, Neb.
Alden Scott Boyer	Cresco, Iowa
James M. Caris	Mt. Pleasant, Mich.
Hugo William Druehl	Salt Lake City, Utah
Herman Herbert Duffey	Anderson, Ind
Albert George Eichler	Hampshire
Peter J. Eulberg	Dell Rapids, S. D.
John James Foley	Davenport, Iowa
Elmer Jonathan Freeman	Chicago
Alfred Frederick Geahart	Chicago
Oscar A. Grulke	Atlantic, Iowa
Holly Parke Harris	Corning, Iowa
Walter Sterling Horn	Mt. Pleasant, Mich.
George Howard	Hanna City
True Howard	Peoria
Louis Edward Johnson	St. Charles
Fred Clifford Jones	Alamosa, Colo.
Eugene O. Leonard	Pocatello, Idaho
August William Lindstadt	Philipsburg, Mont.
Roy W. Markham	Rhinelander, Wis.
John Robert McKinney	Carbondale

William Warren McMaster	Peoria
Linnie Eloise Nixon	Freeport
Ernest O'Neal	Tuscola
Gustave Charles Paesler	Chicago
Robert Whitelife Pease	Highwood
Otto Rudolph Peters	Salt Lake City, Utah
Charles Edgar Pettyjohn	Farmington
Alfred Champlin Proudfoot	Chicago
Fountain Washington Ragland	Montgomery, Ala.
Henry Raithel	Deming, N. M.
Adelbert Willis Russell	Sussex, Wis.
Robert Winfield Sterling	Dixon
Milo Cornelius Taylor	Chicago
Samuel Rogers Taylor	Jamestown, N. D.
Raymond Milner Thompson	Carbondale
Alfred N. Thorsen	Newark
Robert Louis Trunk	Chicago
Harold Harvey Wagner	Marietta, Ohio
Warren Nelson Walker	Howard, S. D.
John Calhoun White, Jr.	Hazelhurst, Miss.

Classes for the Year 1908-1909

Second Year

Adams, Alva Lee	Illinois
Arnold, Arthur Stanley	Illinois
Bakens, Kenneth Walter	Wisconsin
Bantug, Jose Policarpio	Philippine Islands
Beless, James Warren	Utah
Browder, Jay Orison	Illinois
Coburn, Ernest Harlan	Ohio
Cotton, Charles Arthur	Iowa
Crain, Charles Raymond	Illinois
Dewey, Glen Griffin	Iowa
Dodd, John M.	Illinois
Finlay, Matthew Marion	Illinois
Fericks, Andrew Gerard	Illinois
Gaeth, Chauncey William	Nebraska
Gallardo, Marcelino Mendoza	Philippine Islands
Galligan, James Patrick	Illinois
Geyer, Fred Jay	New Mexico

Green, Walter Edgar	Utah
Haldorson, Haldor	North Dakota
Harrison, Albert Martin	Illinois
Holmes, Charles Bernard	Illinois
Huff, Arthur W.	Indiana
Hyrup, James Lester	Illinois
Jameson, Philip Emile	Illinois
Jennings, John Wesley	Illinois
Keim, Charles Adam	Illinois
King, Frank Ray	Michigan
King, Loyd August	Ohio
Kolb, Max William	Wisconsin
Loeffelbein, Charles Augustus	Wisconsin
Madden, St. Clair	Illinois
McElrath, Walter I.	Illinois
McLuen, Maurice Carson	Iowa
Nordvold, Sverre P.	Minnesota
Oswald, Louis William	Illinois
Panzer, George Otto	Nebraska
Rizos, Alexander Constantine	Greece
Rogers, Foster Rob.	Wyoming
Samson, Bernardo	Philippine Islands
Scholes, John Hunter	Illinois
Seaton, Charles Edward	Colorado
Schwerdt, Louis	Illinois
Shirley, Cecil George	Indiana
Shults, Albert Lester	Illinois
Slama, John Thomas	Illinois
Smith, Mark V.	Illinois
Stubbs, Robert J.	Illinois
Sweetland, Melvin Dale	Illinois
Tarbell, Neil Williamson	South Dakota
Wagner, Walter S.	Illinois
Warren, Roy	New York
Watson, Daniel Clark	Utah
Wire, Leslie Harwood	Illinois
Wold, Guy Kenneth	Minnesota
Zobel, Roy Ernest	Colorado

First Year

Abbott, Elmer Reed	Illinois
Allen, Hiron Willard	Illinois

Ammermann, Walter Emil	Michigan
Ball, Massey Carnelius	Texas
Barnette, Earl	Nebraska
Bellamy, Harley Leroy	Nebraska
Bergman, Clarence Walter	Illinois
Butler, George Dwight	Nebraska
Camodeca, Antonio Victor	Illinois
Camodeca, Silvio Umberto	Illinois
Carpenter, Henry A.	Illinois
Carrick, Walter	Iowa
Cunningham, James Francis	Arkansas
Currey, Hiram Wilbern	Indiana
Custer, Charles	Illinois
Devlin, Edward	Illinois
Dowiatt, Stanislaw	Illinois
Duffy, Mark Matthew	Wisconsin
Ekstam, Carl Fred	Iowa
Ellingson, William	South Dakota
Esackson, Charles Harvey	Illinois
Ferguson, Mrs. Luella	Illinois
Fitzgerald, Clement John	Iowa
Folkrod, Cyril Clinton	Illinois
Foresman, Mott	Iowa
Frohlich, Victor	Iowa
Fruehling, Charles Frederick	Iowa
Harden, D. Gratton	Nebraska
Harmon, F. W.	Illinois
Hawley, Verne David	Illinois
Heinen, John Michael	Illinois
Holabird, Harlow, Clay, Jr.	Illinois
Honeyman, James Shephard	Iowa
Hughes, Earl Carlton	Nebraska
Isham, Herbert Austin	South Dakota
Isted, Harry Frank	Illinois
Jacobson, Raphael	Illinois
Jones, Roger J.	Illinois
Kadlec, Edwin L.	Illinois
Kaplan, Ernest Stanley	Minnesota
Kaplin, Jay	Illinois
Katzenberg, Charles	Illinois
Kaufmann, Edward Samuel	Illinois
Kingsley, Wilbur Lloyd	Pennsylvania
Knochel, Joseph Martin	Illinois

Krafft, Walter Anthony	Illinois
Kreiling, Edward Herman George	Illinois
Lapjansky, Michael Anthony	Indiana
Lappley, Harry Martin	Wisconsin
Largent, Will White, Jr.	Illinois
Lauer, Matthias Tillman	Illinois
Lee, Chris Wilbur	Minnesota
Lehmann, Emil Ernest	Illinois
Leonhardt, Charles Edward	Illinois
Levitt, John Joseph	Illinois
Lincoln, Harold James	Illinois
Lindemann, Armin Stoy	Indiana
Logan, A. W.	Illinois
McAfee, John Allen	Colorado
McKamy, Frank Edwin	Illinois
McKelvey, Charles David	Illinois
Miller, Edward	Illinois
Morrison, Earl Orin	Illinois
Morrow, Leonard Holland	Montana
Mueller, William John	North Dakota
Norris, Carter Cox	Illinois
Ohlsen, Olof Howard	Illinois
O'Rourke, James Patrick	Illinois
Orr, Robert James	Illinois
Owells, Albert J.	Illinois
Peoples, Edward Lewis	South Dakota
Peterson, Gustaf Joseph	Oklahoma
Pickard, Joseph Dwight	Illinois
Porter, Carson Hosmer	Illinois
Pulley, Walter Leon	Illinois
Quilling, Fred Albert	Wisconsin
Rabb, Ardwood, John	Iowa
Roth, Martin Arthur	Ohio
Rueckert, Fred Oswald	Illinois
Savage, Percy Whitford	Montana
Schoen, William Arthur	Minnesota
Schopp, Thomas Henry	Illinois
Shaver, Charles Darwin	Illinois
Sims, John Ray	Illinois
Sprague, Arthur Angel	Michigan
Steimle, Frank Walter	Illinois
Stiles, Thaddeus Cornealius	Illinois
Sullivan, Daniel J.	Illinois

Tabenski, Longin Louis	Illinois
Taheny, Edward Patrick	Illinois
Tuohy, Traisius Joseph	Illinois
Wagener, Herman Eugene	South Dakota
Walter, Harry George	Kansas
Warner, Benjamin Greeley	Texas
Wilkinson, James H.	Alabama
Wilson, Fred Douglass	Mississippi
Worthington, Clyde Leonard	Illinois
Youngren, Emil Wilmer	Illinois
Zimmer, Arthur Philip	Illinois

Special Students

Allegretti, John	Illinois
Blake, John Joseph	Illinois
Boe, Harry C.	Illinois
Carr, William Larabee	Illinois
Ernst, Joseph Daniel	Illinois
Graf, Joseph Peter	Iowa
Harris, Herbert Wilson	Illinois
Heiss, Samuel	Illinois
Kahanovski, Isadore M.	Illinois
Keeley, Frank Martin	Illinois
Lovett, Raymond	Illinois
Macker, Paul William	Nebraska
Martin, Glen Thomas	Illinois
Murawski, Alexander Frank	Illinois
Olson, Bernard Samuel	Illinois
Snyder, Charles Frederick	Illinois
Tobias, Oliver Jackson	Illinois
Wyszynski, Walter	Illinois

Tear out this page and mail to the School of Pharmacy of Northwestern University, 87 Lake Street, Chicago.

Send specific information regarding qualifications for entrance to the School of Pharmacy of Northwestern University.

Age ....

General Education ....

Remarks ....

....

Signed ....

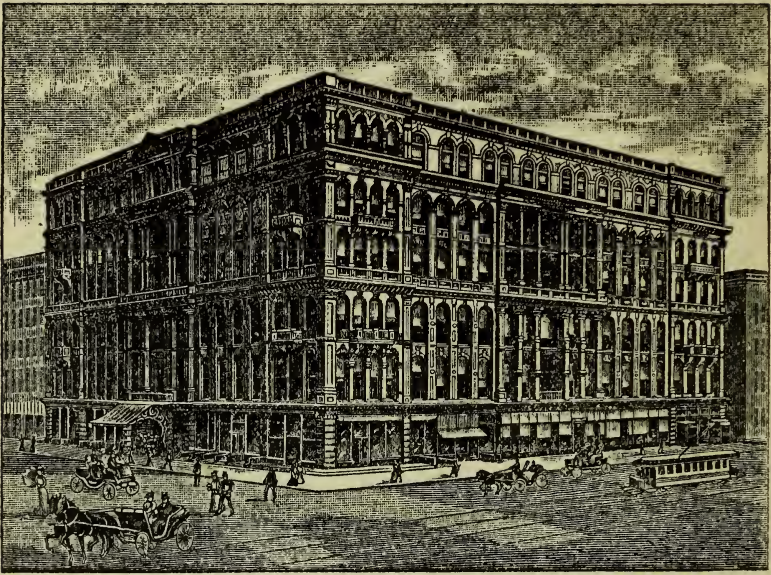
Address ....

Officers of the Alumni Association

President,	CHARLES A. STORER	'88
Vice-President,	WILLIAM H. HARRISON	'03
Vice-President,	GEORGE C. HANSEN	'05
Vice-President,	RALPH H. SMITH	'94
Treasurer,	HENRY F. SCHAPER	'93
Secretary,	GEORGE D. OGLESBY	'91
Trustees,	HENRY F. HAUTH	'07
	OTTO R. PETERS	'08
	JOSEPH F. DVORAK	'08

It is the earnest wish of the officers of the Association that the alumni of the School be found at all times on the right side of every question affecting the welfare of pharmacy as a profession and as a business, and that their influence may be exerted, both individually and collectively, for the betterment of the conditions in which pharmacy is being practiced.

To this end it is the desire of these officers to stimulate the holding of meetings of the alumni wherever this is practicable, particuuarly at the annual conventions of the various state pharmaceutical associations, the American Pharmaceutical Association and the National Association of Retail Druggists. Correspondence with the Secretary of the Association looking to the perfecting of arrangements for such gatherings of the alumni is cordially urged.



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Northwestern University

BULLETIN OF THE

SCHOOL of PHARMACY

PUBLISHED QUARTERLY

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SEP 8 1910

Vol. VII No. 2
January to March, 1909

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September 27, 1909

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LAKE AND DEARBORN STREETS, CHICAGO

Entered June 24, 1902, at Chicago, Illinois, as Second-Class Matter, under Act of Congress of July 16, 1894.

Northwestern University

THE location of Northwestern University, in and near a large city, and its property valued at $9,000,000, afford advantages that cannot be excelled.

THE COLLEGE OF LIBERAL ARTS

located at Evanston, in an ideal college community, offers preparation for business, the professions, and for pursuits requiring broad training.

THE MEDICAL SCHOOL

is one of the oldest, largest, and best equipped. Seven hospitals are open to students. Clinic material is abundant.

THE LAW SCHOOL

the oldest law school in Chicago, offers unexcelled library facilities and special courses that prepare for immediate practice in any state upon graduation.

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founded in 1907 at Evanston. Swift Hall of Engineering completed in 1908. Offers advanced courses in all branches of Engineering.

THE SCHOOL OF PHARMACY

offers a scientific training in pharmacy, chemistry and drug and food analysis. Laboratory equipment the best.

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offers expert training in theory and practice. Facilities are unsurpassed. Its clinic is the largest in the world.

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affords a scientific preparation for music as an accomplishment and a profession. It is located at Evanston.

THE SCHOOL OF COMMERCE

offers University courses in accounting, banking, and business principles. Located in the business center of Chicago.

Evanston and Chicago

TABLE OF CONTENTS

Page.
Officers of the Corporation of Northwestern University................ 3
Executive Committee of the School of Pharmacy...................... 3
The Faculty 4
School Calendar 2
How to Achieve the Highest Success in Pharmacy.................. 5
More Pharmaceutical Chemists.. 7
Commencement Week at Evanston................................. 7
The University 9
The School of Pharmacy.. 9
The College Building 10
Location of the School.. 10
The Library 11
Museum and Exhibits 11
The General Pharmaceutical or Manufacturing Laboratory........... 12
The General Chemical Laboratory................................ 12
The Laboratory for Analytical Pharmaceutical Chemistry and Food and Sanitary Analysis 13
The Laboratory for Pharmaceutical Botany, Microscopy and Pharmacognosy 13
The Dispensing Laboratory 14
Course for the Degree of Graduate in Pharmacy.................... 15
Course for the Degree of Pharmaceutical Chemist................... 15
Post-Graduate Course for Graduates in Pharmacy................... 15
Degree of B. S. in Pharmacy.. 15
Degree of Master of Pharmacy...................................... 15
Food and Drugs Course... 16
Special Courses 16
Credits for Work Done in Other Schools and Colleges................ 16
Qualifications for Admission.. 16
Requirements for Graduation 17
Occupations Open to Graduates...................................... 17
Fees and Expenses 17
Rooms and Board... 18
Brief Summary of the Courses of Instruction......................19-26
    For the Degree of Graduate in Pharmacy....................... 19
    For the Degree of Pharmaceutical Chemist...................... 24
    Urine Analysis.. 25
    Bacteriology 26
    Food and Drugs Courses...................................... 26
Graduates 27-28
Students 28-31
Blank for Prospective Students...................................... 32
Officers of the Alumni Association....................Inside Back Cover

School Calendar

January, 1909, to September, 1910

1909		
Jan. 4.	Mon.	Instruction resumed, after Christmas recess.
Feb. 12.	Fri.	Lincoln's Birthday.
Feb. 22.	Mon.	Washington's Birthday.
Apr. 6.	Tue.	Examinations begin.
Apr. 6.	Tue.	Easter recess to Sunday, April 11, inclusive, Pharmaceutical Chemist course, first year class.
Apr. 12.	Mon.	Instruction resumed, Pharmaceutical Chemist course.
Apr. 12.	Mon.	Alumni Banquet.
Apr. 14.	Wed.	Graduating exercises, Graduate in Pharmacy course.
May 31.	Mon.	Senior examinations begin, Pharmaceutical Chemist course.
June 8.	Tue.	Alumni Dinner.
June 9.	Wed.	Fifty-first Annual Commencement of the University.
June 19.	Sat.	First year's work ends, Pharmaceutical Chemist course.
1909-1910		
Sept. 27.	Mon.	First day of registration.
Sept. 29.	Wed.	Lectures and class work begin.
Nov. 25.	Thur.	Thansgiving recess to Sunday, November 28, inclusive.
Dec. 20.	Mon.	Christmas vacation to Sunday, January 2, inclusive.
1910		
Jan. 3.	Mon.	Instruction resumed.
Feb. 12.	Sat.	Lincoln's Birthday.
Feb. 22.	Tue.	Washington's Birthday.
Apr. 5.	Tue.	Examinations begin, Graduate in Pharmacy course.
Apr. 5.	Tue.	Easter recess, to Sunday, April 10, inclusive, Pharmaceutical Chemist course.
Apr. 11.	Mon.	Instruction resumed, Pharmaceutical Chemist course, first year class.
Apr. 11.	Mon.	Alumni Banquet.
Apr. 13.	Wed.	Graduating exercises, Graduate in Pharmacy course and the three years Pharmaceutical Chemist course.
May 30.	Mon.	Memorial Day.
May 31.	Tue.	Senior examinations begin, Pharmaceutical Chemist course.
June 7.	Tue.	Alumni Dinner.
June 8.	Wed.	Fifty-second Annual Commencement of the University.
June 18.	Sat.	First year's work ends, Pharmaceutical Chemist course.

Officers of the Corporation of Northwestern University

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HENRY SHERMAN MAYNARD
THEODORE HENRY PATTERSON, M.D.
CHARLES HAMILTON AVERY

Faculty of the School of Pharmacy

1909-1910

ABRAM WINEGARDNER HARRIS, Sc.D., LL.D., *President of the University.*

OSCAR OLDBERG, PHARM. D., *Dean, Professor of Pharmacy and Director of the Pharmaceutical Laboratories.*

THOMAS VICTOR WOOTEN, PH.G. *Administrative Officer, Lecturer on Pharmaceutical Economics.*

WILLIAM EDWARD QUINE, M.D., LL.D., *Emeritus Professor of Physiology, Therapeutics and Toxicology.*

HARRY MANN GORDIN, PH.D., *Professor of Chemistry and Director of the Chemical Laboratories.*

MAURICE ASHBEL MINER, PHARM. M., *Assistant Professor of Pharmacy, in charge of the Manufacturing laboratory. Curator.*

CHARLES WAGGENER PATTERSON, Sc.B., PH.C., *Assistant Professor of Organic Analytical Pharmaceutical Chemistry, in charge of the Organic Chemical Laboratory.*

HARRY KAHN, PHARM. M., M.D., *Assistant Professor of Physiology and Materia Medica.*

EUGENE SHAW WILLARD, D.D.S., *Assistant Professor of Bacteriology.*

GERHARD H. JENSEN, PH.D., *Instructor in Botany and Pharmacognosy.*

WILLIAM HENRY HARRISON, PH.C., *Instructor in the Chemical Laboratories.*

JOHN FERDINAND FISCHNAR, PH.C., *Instructor in Pharmacy, in charge of the Dispensing Laboratory.*

ERNEST WOOLLETT, *Instructor in Accounting and Business Methods.*

JAMES LEWIS CLAY, PH.C., *Assistant in the Chemical Laboratories.*

BULLETIN

OF THE

SCHOOL OF PHARMACY

OF

NORTHWESTERN UNIVERSITY

JANUARY-MARCH, 1909

How to Achieve the Highest Success in Pharmacy

The practice of pharmacy consists of technical laboratory work. This includes the making of pharmaceutical preparations, the identification and examination of the materials employed in the dispensing department, and the service performed in compounding and dispensing.

Nearly all the older civilized countries have for many generations fully recognized the pre-eminently scientific-technical character of the pharmacist's occupation and its direct, intimate and vital importance in the rational treatment of disease and the protection of the public from the serious consequences attending the dispensing and sale of medicines by persons lacking the special knowledge, training and experience necessary to safety. Those countries prescribe for all pharmacists definite courses of education in universities or polytechnic schools or in special pharmaceutical schools supported by the government. This compulsory special pharmaceutical education usually occupies two years.

An effective systematic regulation of the practice of pharmacy for the protection of the public has not yet been accomplished in the United States, but an awakening to the necessity therefor is evidently near at hand. Such legislation as we have had for the regulation of the sale of drugs originated with the druggists themselves. But the medical profession and the public are at last becoming interested, and the retail druggist, as the direct result of the widespread propaganda in favor of fully known medicines for which official standards have been established as against proprietary preparations the character and composition of which are unknown or only partly known, is beginning to discover and recover his real occupation.

The retail druggist has at last been brought to a keener realization of the fact that the only part of his occupation which makes him a pharmacist and entitles him to special recognition under the laws is the technical service he alone can render, and which constitutes the only means of protection that can be afforded the public against the perils of ignorance and abuse in a business which vitally concerns human life, health and happiness.

The pharmacist uses his time to the best possible advantage for the welfare of the public as well as himself by furnishing technical service rather than merchandise. He should himself make the preparations he dispenses instead of being merely a dealer in other men's products.

Excessive commercialism has to a great extent stifled pharmacy in the United States. We have several times as many drug stores in proportion to population as any other country, a condition which breeds an increasing number of so-called pharmacies, many of them of such a low order as to constitute a constant menace to public health and morals. The only remedy is higher standards of education for all who may hereafter be armed with licenses entitling them to increase, at will, the already excessive number of drug stores. This is a remedy which will surely receive the approval of both the public and the medical profession, as well as the pharmacists already in business.

Pharmacists who possess a good technical education, as well as a fair share of business capacity and industry, find their profession peculiarly attractive. Young men desiring to engage in a life occupation which is professional-technical, which is remunerative, and which promises the realization of their natural and proper ambition to become their own masters, will find the practice of pharmacy inviting because the demand for efficient pharmaceutical service is far greater than the supply of men sufficiently well trained to render that service successfully, and because it requires far less capital to engage in a business consisting for the greater part of actual pharmacy and less of mere commerce than to conduct the ordinary commercial drug store.

But the training necessary to success in the practice of pharmacy cannot be obtained in a commercial drug store. Such training can to-day be acquired only in well-equipped and properly conducted pharmaceutical schools, where the students spend most of their time in doing practical work at the laboratory tables, constantly in touch with experienced teachers.

More Pharmaceutical Chemists

An exceedingly gratifying sign of the times is the large number of students registered at Northwestern for the whole program of work prescribed for the degree of Pharmaceutical Chemist. This program occupies two school years of nine months each, or three school years of six months each, with the student's whole time fully employed to the best advantage upon his courses of study and laboratory work. It is the most extensive course of pharmaceutical education given by any school of pharmacy. The degree of Pharmaceutical Chemist, when its established significance is respected, cannot be conferred upon anyone having less preparation.

The total number of students registered at Northwestern during the current year for this program of work is nearly seventy, which indicates that the most substantial pharmacy course offered in an American school is sought by a greater number of students than at any time in the past.

Commencement Week at Evanston

All alumni of the School of Pharmacy are urged to spend the first week of June—Commencement Week—in Evanston. They cannot possibly find a better way in which to spend a portion of their vacation.

For many years Dean Lutkin, of the School of Music, has cherished hopes of giving musical festivals in Evanston. With the erection of the great gymnasium building—the largest and most complete of its kind in the country—an ample auditorium is secured, and such large musical gatherings are now assured. The festival will immediately precede the University Commencement, occupying Thursday, Friday and Saturday of the first week in June.

The opening number of the first concert will be an overture, written specially for the occasion, by Professor Arne Oldberg of the School of Music. This number concludes with the singing of the new Northwestern University Hymn, "Quaecumque sunt vera," in which the festival chorus of five hundred voices and the student body will join, accompanied by the full orchestra.

Evanston at that season of the year is in its loveliest garb. The campus, with the addition of the great gymnasium and the new School of Engineering, is gradually conforming to the elaborated landscape plan which has been adopted for the greater Northwestern University.

Additional features of interest will be the various student exercises, including the torch-light procession and illumination of the campus, the class-day exercises of the Senior Class, athletic events, the President's Levee to which alumni of all the schools of the University are invited, and the Commencement in the Gymnasium at which nearly 600 candidates will receive degrees.

The gymnasium recently erected at a cost of two hundred thousand dollars, is on the campus just south of the astronomical observatory. This is perhaps the most beautiful building on the North Shore. Two-thirds of the immense building is partitioned off for an "indoor athletic field," and it is in this field that the festival and the Commencement will be held.

The dimensions are 215 by 120 feet, without obstructions, the roof being supported by immense steel arches. This indoor athletic field forms a finely proportioned auditorium, which will afford seating capacity for from three to four thousand auditors.

Northwestern University

Northwestern University was founded in 1851. The property and endowments of the University are valued at more than nine million dollars. Its faculties include 358 teachers. Its libraries contain nearly 211,000 bound volumes. The total enrollment of students in 1908 was 4,086. Its degree-conferring departments include the College of Liberal Arts and the Schools of Medicine, Law, Engineering, Pharmacy, Dentistry, Music and Commerce.

The School of Pharmacy

was established in 1886. Its equipment is valued at over $25,000. It is housed in Northwestern University Building, in a manner well suited to the school's needs, in the heart of the business center of Chicago.

The average annual attendance of the School of Pharmacy is over two hundred, and there are now 1,732 alumni. Its students come from all parts of the United States.

The Faculty of Northwestern University School of Pharmacy has always included experienced men. Their contributions to the progress of scientific pharmacy and pharmaceutical education are well known. Nearly all of them, before entering upon educational work, were engaged for many years in the practice of pharmacy and are acquainted intimately with the technical details which must receive attention in the training of practical pharmacists.

All the courses of instruction in this School are given exclusively to the students of pharmacy. In these circumstances the teachers are enabled to specialize to the fullest extent.

The American Conference of Pharmaceutical Faculties is a national association of the faculties of pharmaceutical schools which have mutually agreed to maintain certain definite educational standards. All schools more than ten years old are members of the Conference. The School of Pharmacy of Northwestern University is a member.

All members of the Conference receive equal recognition under the pharmacy laws of those states in which actual special education for pharmacy is required or given any credit. In many of the states, however, actual systematic education for pharmacy is neither required nor given consideration; all that is necessary in those states is the passing of the State Board examination. Graduates of well-equipped and rightly conducted pharmaceutical schools can, of course, pass any proper examination. But in the states of Alabama, Arkansas, Delaware, Missouri and West Virginia the Boards of Pharmacy are required by the laws to license without examination all persons who may be graduates of those colleges of pharmacy which include a certain amount of drug store service among their graduation requirements.

The College Building

Northwestern University Building, on the northeast corner of Lake and Dearborn Streets, is 160 by 180 feet and seven stories in height. It is provided with steam heat, electric lights and electric elevators, and is in every way admirably adapted to school purposes. The Schools of Law, Pharmacy, Dentistry and Commerce are all located in this building.

Location

The School of Pharmacy could not be more centrally located. It is easily accessible to the eleven hundred drug stores in Chicago and its suburbs, and is within a few blocks of all the wholesale drug houses and the dealers in chemical apparatus and supplies.

The great public libraries, of which there are a number in Chicago, are near at hand.

A quiet residence district near Lake Michigan may be reached in a few minutes' walk from the School. Rooms and boarding places can be readily secured there at moderate rates. Eating houses abound throughout the city and there is an excellent lunch room in the University Building itself.

The Library

The School possesses one of the most valuable pharmaceutical reference libraries in this country. It now contains 1,300 bound volumes and 1,460 pamphlets. All the principal current chemical and pharmaceutical journals, foreign and American, are received, and are accessible alike to instructors and students.

The library includes complete sets of Archiv der Pharmazie; the Centralblatt from 1870 and the Berichte der Deutschen Chemischen Gesellschaft from 1868; also, complete from 1893, Zeitschrift für analytische Chemie, Neueste Erfindungen und Erfahrungen, Berichte der Pharmazeutischen Gesellschaft, Journal of the London Chemical Society, Pharmazeutische Centralhalle, and Repertoire de Pharmacie; complete sets of the British Pharmaceutical Journal, Proceedings of the American Pharmaceutical Association, and the American Journal of Pharmacy.

The library also contains all the pharmacopœias of the world with supplements to date, dispensatories and commentaries on the pharmacopœias, pharmaceutical and chemical encyclopœdias and dictionaries, pharmaceutical and other technical formularies, the most valuable reference works and textbooks on chemistry, pharmacy, materia medica, and related subjects, the publications of the American Chemical Society, etc.

The library and reeading room contains spacious tables for the use of the students, and the reference works and textbooks most frequently consulted by the students are conveniently accessible. The American pharmaceutical and drug journals are placed upon the tables as soon as received.

The Museum and Exhibits

The museum contains more than two thousand specimens of drugs, chemicals, pharmaceutical preparations, and other substances of medicinal or industrial importance, pharmaceutical and chemical apparatus and implements, and other articles of interest to the students.

Authentic specimens of distinct varieties of plant drugs, including many of great value or of special interest, are contained in these collections, including not only exceptionally fine drugs, but also spurious ones. All plant drugs used to a sufficient extent to be found in the drug markets are represented by good specimens in the museum.

The exhibits of chemical products, inorganic and organic, are exceptionally large, and the exhibits of pharmaceutical products and sick-room supplies are instructive.

Specimens of numerous kinds of chemicals and preparations manufactured by the students attest the practical character of the laboratory training given in the School.

The Laboratories

The laboratories, or workshops, in which the students spend more than two-thirds of their time, are of such size that about 300 students can all work at the same time. These laboratories are fully equipped, well lighted, and afford abundant work space for each student. The total floor space occupied is approximately 11,000 square feet.

Each laboratory is provided with adjoining storerooms, balance rooms, hoods and other requisites.

The General Pharmaceutical or Manufacturing Laboratory

This laboratory occupies a room about 60 by 40 feet, which is lighted by twelve large windows. It has individual accommodations for 288 students, the classes being arranged in four sections.

Students taking the course for the degree of Graduate in Pharmacy receives 300 hours' instruction in this laboratory and makes from 150 to 200 preparations. Candidates for the degree of Pharmaceutical Chemist have, in addition, 84 hours' work in the production of organic chemical compounds.

The General Chemical Laboratory

This room has a floor space of 1,800 square feet and individual accommodations for 216 students in three sections. It is well lighted, and good ventilation is maintained by means of an eight-foot electric fan. Each student receives in this laboratory 200 hours' instruction during the first six months, and those taking the course for the degree of Pharmaceutical Chemist have here 135 hours' additional practice.

The Laboratory for Analytical Pharmaceutical Chemistry and Food and Sanitary Analysis

This laboratory has individual work tables for sections of twenty-eight students at a time. These tables are unusually spacious, and additional work space is provided upon other large tables. Hoods and drying ovens, together with all the modern special apparatus and instruments requisite to thorough teaching, are included in the equipment of this laboratory as in the equipment of the other laboratories. Platinum dishes and crucibles and other platinum ware are supplied in ample quantity, and only the best porcelain and glassware is used.

The weighing room, situated between the chemical laboratories, contains fifteen analytical balances of the best make, sensitive and accurate to the tenth of a milligram.

Students taking the course for the degree of Graduate in Pharmacy have forty-five lessons of three hours each in this laboratory. Students taking the course for the degree of Pharmaceutical Chemist have 240 hours' additional work.

The Laboratory for Pharmaceutical Botany, Microscopy and Pharmacognosy

The floor area of this laboratory is 1,224 square feet. It is a long room, with all the work tables placed against the eight large windows on one side of the room. The light is of the kind most suitable for microscopical work.

The department is well supplied with colored charts and plates, an ample stock of drugs, and all requisite apparatus such as section cutters and camera lucida.

The compound microscopes furnished to all students for the work in this laboratory are of Leitz's make, each supplied with one-inch and one-quarter-inch objectives, two eyepieces, double nose-pieces, and other accessories.

Every student has fifty periods of instruction in this room, each of two hours' length, in each school year of the course for the degree of Graduate in Pharmacy, and students registered for the degree of Pharmaceutical Chemist receive forty-two hours' additional work in commercial microscopy.

The Dispensing Laboratory

This now occupies a room with a floor area of 1,450 square feet, with accommodations for over a hundred students divided into sections. From twenty to thirty students are assigned to each section.

The School of Pharmacy of Northwestern University was the first to introduce laboratory courses of instruction in the art of dispensing. Twenty-three years' practical experience has demonstrated the value of this course. Systematic training and a sufficient variety of technical work at the dispensing table can no longer be found in the retail drug store. A special dispensing laboratory is, therefore, at this time one of the most important features of the equipment of an efficient training school for pharmacists.

The dispensing laboratory of this School is equipped with an outfit of implements and apparatus many times as extensive as can be found in any drug store. Each student is taught how to use these tools in a workmanlike fashion.

Powders, pills, troches, capsules, tablet triturates, compressed tablets, ointments, plasters, suppositories, and a great variety of liquid mixtures, including emulsions, are prepared under the direction of an experienced practical pharmacist.

Each student sees and does a greater variety of dispensing work in this laboratory than comes to an operator in any drug store in the course of several years, because the lessons (approximating 400) are carefully chosen, and are prepared examples illustrating all phases of manipulation, typical as well as exceptional.

Each student has fifty lessons of two hours each in this course.

Courses and Degrees

The degrees conferred are those of Graduate in Pharmacy, Pharmaceutical Chemist, Bachelor of Science in Pharmacy, and Master of Pharmacy. A Food and Drugs Course is also offered.

Degree of Graduate in Pharmacy (Ph. G.)

The course for this degree occupies two school years of six months each, during which the student devotes his whole time to his studies and laboratory work.

The same course occupies two years of nine months each when the student engages in concurrent drug-store employment and when he, accordingly, carries only two-thirds of the weekly program of studies pursued by students who give their whole time to school work.

Course for the Degree of Pharmaceutical Chemist (Ph. C.)

This extends through two school years of nine months each, with the student's whole time occupied with his studies and laboratory work. The three years' course for the same degree occupies the student's whole time through three school years of six months each. The program of work is the same as in the two years' course.

A Post-Graduate Course

A post-graduate course is offered to Graduates in Pharmacy of other schools who have had sufficient preparation to undertake the completion of the prescribed curriculum for the degree of Pharmaceutical Chemist in one additional year. In this course the program of work is modified in each case so as to enable the student to take all the work which he has not already had.

Degree of B. S. in Pharmacy

This degree requires four years, two years of study in the College of Liberal Arts and two years in the School of Pharmacy.

Degree of Master of Pharmacy

This degree is conferred upon completion of three years of study in the College of Liberal Arts and two years in the School of Pharmacy.

Food and Drugs Course

The curriculum prescribed for the degree of Pharmaceutical Chemist affords adequate special training not only for the practice of pharmacy, but also for the expert work required by food and drug legislation. This curriculum is modified to some extent at the option of students who desire to specialize more in the direction of the examination of food and drugs and who do not intend to practice pharmacy.

Special Courses

Special students are admitted, by special action of the Faculty, to any of the individual courses included in the program of work required for a degree, to advanced courses and to any additional special courses which the School is prepared to offer. The fees for such elective courses are in proportion to their extent, and full credit is given in the form of certificates for work satisfactorily completed.

Credits for Work Done in Other Schools and Colleges

Students who have satisfactorily completed the first year's work in any other approved college or school of pharmacy upon presentation of proper evidence to that effect are admitted to the second year class, provided the work done in each subject is fully equivalent to that of the first year's program of this School and provided that his work conforms to the rule that related subjects must be studied in logical sequence.

Credit is given, subject to the same conditions, for any courses in individual subjects satisfactorily completed elsewhere, so far as these subjects are included in the required studies of this School.

Qualifications for Admission

Candidates for the degree of Graduate in Pharmacy must, in accordance with the rule of the American Conference of Pharmaceutical Faculties, present evidence of having completed satisfactorily at least one full year of work in an accredited high school, or its equivalent, and must be not less than seventeen years of age.

Candidates for the degree of Pharmaceutical Chemist must have completed two years' work in a high school of accepted grade, or must possess an equivalent general education.

Requirements for Graduation

The requirements for graduation include regular attendance, the satisfactory completion of the prescribed program of work, good moral character and satisfactory deportment, and the settlement of all accounts.

Degrees are conferred at the Graduating Exercises held at the conclusion of the Graduate in Pharmacy course in April and at the general University Commencement in June. On these occasions all candidates for degrees are required to be present in person, the Oxford cap and gown being worn as the official dress.

Occupations Open to Graduates

Applications made to this School for graduates to fill desirable positions have, for many years, exceeded the supply. As a rule, graduates secure positions, by mail or otherwise, in advance of leaving the School.

The occupations open to graduates include the drug business, wholesale and retail; modern professional pharmacy; positions as pharmacists in the Army, Navy, and the Public Health and Marine-Hospital Service; as hospital pharmacists; work under the national, state and municipal governments in connection with the enforcement of the food and drugs laws; and employment in manufacturing and wholesale establishments, in connection with the production and examination of foodstuffs and medicines.

Fees and Expenses

The matriculation fee is $5, and payment of this fee is necessary to secure enrollment. It is payable but once and before admission to the School. Before instruction begins, the matriculates are assigned to their respective classes in the laboratories and recitation rooms and allowed to select tables and seats in the order of enrollment.

The annual fee for tuition and materials for the course leading to the degree of Graduate in Pharmacy is $100. Students registering for the course leading to the degree of Pharmaceutical Chemist are required to pay the additional sum of $40.

A laboratory deposit of $10 is required of each student. This fee is to cover breakage or loss of apparatus and damage to other property. All unexpended portions of laboratory deposits are refunded at the close of the school year after deducting $3 for wear and tear and maintenance of microscopes, balances and other apparatus.

The diploma fee, payable two weeks before graduation, is $10.

Certain indispensable articles that render the work effective and orderly (not materials consumed) are furnished by the school for the convenience of students. These articles include note books, drawing books, dissecting needles for use in the microscopical laboratory, aprons and sleeves, additional pieces of apparatus required to replace those broken or lost, and other items. A coupon ticket to the amount of $5 is used for the purpose of procuring these articles when needed, and supplies of this kind are furnished in no other way. Unused coupons are redeemed at the end of the year or whenever the student discontinues his attendance and settles his accounts.

No tuition or other fees are refunded except in case of the student's illness. In that case, if the student presents a certificate from a physician that he is unable to remain in attendance, one-half of the current semester's fees will be refunded, provided application is made before the middle of the semester. In all such matters the policy of the School management is one of liberality.

Rooms and Board—Good board and room together can be secured near the school at from $4 to $6 per week. Students may also secure rooms and board separately. Information in regard to these matters and addresses of reliable and satisfactory private boarding places and furnished rooms will be supplied at the College office. Every effort will be made to assist students to find, at reasonable prices, homelike living quarters, where the sanitary and moral conditions are all that could be desired. (See page 32)

For further information address The School of Pharmacy, NorthWestern University Building, Lake and Dearborn Streets, Chicago.

BRIEF SUMMARY OF THE COURSES OF INSTRUCTION

Courses for the Degree of Graduate in Pharmacy

FIRST YEAR

A. DEPARTMENT OF THEORY AND PRACTICE OF PHARMACY

Professor Oldberg, Assistant Professor Miner and Mr. Harrison

A1 to A7. *Professor Oldberg.* Three hours weekly.

A1. INTRODUCTORY lectures defining pharmacy and stating its functions and problems.

A2. THE PHARMACOPŒIA.—Its objects, scope and construction.

A3. WEIGHTS AND MEASURES.—Mass, volume and density. Principles of metrology. The Metric System. Commercial and medicinal weights and measures of America and of Great Britain. Balances and weights. Volume measures. Specific density and specific volume. Instruments and methods employed in the determination of "specific gravity."

A4. ELEMENTARY MATERIA PHARMACEUTICA.—Preparatory discussion of the various classes of materials employed in the preparation of medicines.

"Crude drugs," organic and inorganic. Character and mixed composition of plant drugs. *Pharmaceutical properties* of their constituents, such as cellulose, starch, mucilage, pectin, sugar, albumin, fixed oils and fats, tannin, bitters, volatile oils and related substances, resinous matters, glucosides and other neutral principles, and alkaloids.

A5. GENERAL PHARMACEUTICAL PROCESSES AND MANIPULATIONS WHEREBY MEDICINAL PREPARATIONS ARE MADE. Heat and its practical applications in pharmaceutical operations. Heating apparatus and appliances. Mechanical division of drugs; cutting, crushing, grinding, contusion, trituration, sifting. Fineness of powders. Solution, filtration, evaporation, crystallization, precipitation. Sublimation and distillation. Maceration, digestion and percolation. Other methods. Apparatus used.

A6. GALENICAL PHARMACEUTICAL PREPARATIONS.—*General description* of the several classes of pharmaceutical products. Stock preparations and ex-tempore preparations. Species, powders, confections, troches, masses, pills. Cataplasms, ointments, cerates, plasters, suppositories. Liquid mixtures, including emulsions. Solutions, waters, mucilages, syrups, glycerites. Alcoholic solutions. Infusions, decoctions, tinctures, wines, vinegars, fluid extracts and other liquid extracts. Solid extracts, oleoresins and precipitated resins. Other preparations.

A7. Pharmaceutical Nomenclature.—Systematic and non-systematic names of drugs, chemicals and preparations. Value of latinized or latinic technical titles and their non-latinic equivalents. Principles of construction. Pronunciation, proper abbreviations.

A8. *Assistant Professor Miner.* Two periods weekly of three hours each.

Pharmaceutical Laboratory Practice.—Work designed to familiarize the student with apparatus. processes and materials, and to apply the lessons taught in the didactic courses. This course in pharmaceutical and chemical operations includes the manufacture of a great variety of finished preparations. The work is done in the General Pharmaceutical or Manufacturing Laboratory and constitutes the first part of the practical training in operative pharmacy.

The students are permitted to take away with them at the end of the year the preparations they make.

A9. *Mr. Harrison.* One hour weekly in the class room together with additional assigned text-book lessons.

Pharmaceutical Arithmetic.—Instruction and practice in the solution of the every-day mathematical problems of pharmacy. These problems include weights and measures, doses, proportion, percentage, dilution and fortification and other examples in the computation and adjustment of strength of drugs and preparations, specific gravity and specific volume, etc.

B. DEPARTMENT OF CHEMISTRY

Professor Gordin and Mr. Harrison

B1. *Professor Gardin.* Three hours a week.

General and Inorganic Chemistry, theoretical and descriptive. The principles of the science. The chemical elements and their more important compounds. A course designed to lay the foundation necessary to the successful pursuit of the further work in this department.

Laboratory Work.—*Professor Gordin and Mr. Harrison.* Three laboratory periods of three hours each and one recitation hour each week.

B2. Experimental Study of the physical and chemical properties of the elements of greatest importance in the elucidation of chemical phenomena and the products of chemical action.

B3. Qualitative Analysis.—Practical study of the methods of separation and identification of the principal bases and acids and of the reactions involved therein.

Analysis of inorganic substances and mixtures, the composition of which is unknown to the student.

Study of the reagents and methods employed in the application of the identity and purity tests of the Pharmacopœia.

C. DEPARTMENT OF PHARMACEUTICAL BOTANY, MICROSCOPY AND PHARMACOGNOSY

Doctor Jensen. One lecture hour and two laboratory periods of two hours each, a week.

C1. The optical properties of mirrors and lenses and the mechanism and manipulation of the microscope.

The organs, tissues and microscopical structure of plants and plant drugs. Cell contents and their recognition.

This course constitutes the necessary preparation for the practical study of vegetable drugs. (Course C2.—page 23.)

D. HUMAN ANATOMY AND PHYSIOLOGY

Assistant Professor Kahn. Lectures one hour each week.

A course designed to give the student such a knowledge of the human body and its organs and functions as will enable him to understand in a general way the processes of nutrition, circulation, respiration, and the mode of action of drugs.

SECOND YEAR

A. DEPARTMENT OF THEORY AND PRACTICE OF PHARMACY

Professor Oldberg, Assistant Professor Miner, Mr. Harrison and Mr. Fischnar.

A10 to A13. *Professor Oldberg.* Three hours a week.

A10. The Individual Galenical Preparations of Organic Drugs.—Their pharmacy and its relation to their chemical constituents. The important preparations of the Pharmacopœia and the National Formulary are fully discussed in this course.

A11. The Inorganic Chemical Preparations.—Applied inorganic pharmaceutical chemistry. General principles governing the manufacture of chemicals, especially such as may be successfully and profitably made by practicing pharmacists without any other apparatus than that which is necessarily included in the outfit of every properly equipped pharmacy.

The organic pharmaceutical chemicals and their pharmacy also receive due attention in this course.

A12. Extempore Operative Pharmacy.—Extempore preparations of the pharmacopœias and formularies. How they are made.

Physicians' Prescriptions and their construction and interpretation. The dispensing department and the art of dispensing. General and special rules. Incompatibilities.

The text used consists of a collection of thousands of formulas and prescriptions, exceptional as well as typical, showing the greatest variety of construction, phases of manipulation, ingredients, and difficulties requiring special treatment. These examples in extempore operative pharmacy have been compiled expressly for the purpose of placing before the students a more extensive and instructive variety of problems than will be found in the prescription files during many years of active work in the busiest of representative prescription drug stores. The collection is in book form, so that teacher and students can analyze and discuss the examples together in order to cultivate and test the student's ability to decide upon the best way to meet each problem, and to detect errors and incompatibilities.

A13. The duties and responsibilities of pharmacists and their agents. Pharmacy laws. The relation of pharmacists to the medical profession and the public. Pharmaceutical ethics.

A14. *Assistant Professor Miner.* Two periods weekly of three hours each.

SENIOR LABORATORY COURSE in the manufacture of pharmaceutical preparations, galenical and chemical, organic and inorganic, official and unofficial.

The extraction and purification of important natural constituents of plant drugs.

Each student makes a large variety of finished products, including important and commonly used preparations of the Pharmacopœia and the National Formulary, especially those which can and should be made by the practicing pharmacist.

Special care is taken to prepare the student to do successfully and well the work which pharmacists are now called upon to do as the result of the active propaganda in favor of the use of U. S. P. and N. F. preparations in preference to proprietary products. Among the inorganic chemical preparations made are mercury compounds, bismuth compounds, granular effervescent salts, and many iron compounds including scale-salts. Among the organic substances made are aloin, salicin, amygdalin, piperin, salicylic acid, oil of cloves and natural benzoic acid. Each student is permitted to keep samples of the preparations he makes.

Hundreds of products made by the students are shown in special exhibits at the school.

A15. *Mr. Fischnar.* Two laboratory periods a week of two hours each in the Dispensing Laboratory, and a course of six special lectures on sick-room supplies and "druggists' sundries."

THE LABORATORY COURSE IN DISPENSING is of the utmost importance in the practical training of pharmacists.

The service at the dispensing table comprises the crowning functions of the pharmacist. It is most effectively taught in a special laboratory equipped with all the facilities, apparatus and variety of materials at the command of a competent teacher, who has had ample experience in the practice of pharmacy.

THE SPECIAL LECTURES include instruction in regard to the miscellaneous medicinal and pharmaceutical preparations and sick-room supplies supplied by all well-equipped retail drug stores. These articles include such things as are not made by pharmacists themselves as, for instance, troches, coated pills, filled gelatin capsules and other like ready-made pharmaceutical products; infant foods and other dietetic supplies; sanitary and surgical preparations, appliances and dressings; rubber goods, atomizers, sick-room apparatus and glassware, and the various other articles necessarily furnished by the pharmacist. How such supplies are best kept in good condition. These articles are exhibited to the class.

A16. *Mr. Harrison.* One hour a week in the classroom together with additional assigned text-book lessons

Pharmaceutical Chemical Problems.—Exercises in writing equations and in solving problems relating to applied pharmaceutical chemistry.

B. DEPARTMENT OF CHEMISTRY

Professor Gordin, Assistant Professor Patterson and Mr. Harrison.

B4. *Professor Gordin.* Three hours a week.

Organic Chemistry.—The principles of the chemistry of the combustible carbon compounds. Their structure, classification and methods of production. Organic substances important to pharmacy, including the so-called "synthetics," are given special attention.

This course fits the student to pursue intelligently the courses in organic pharmaceutical testing, drug assaying, the production of organic chemical preparations and other practical laboratory work, and to understand fully the text of the pharmacopœia descriptive of the organic chemicals, alkaloids, volatile oils, etc.

B5. *Assistant Professor Patterson.* Forty-five laboratory periods of three hours each.

Volumetric Analysis and Pharmaceutical Testing. Principles and methods. Practice in the preparation and use of standard volumetric test solutions. Alkalimetry and acidimetry and other volumetric analytical processes. Indicators and their uses.

Practice in the application of the purity tests prescribed in the Pharmacopœia, and in the volumetric quantitative examination of important chemical preparations by the official methods; also the determination of alcohol in tinctures, fluid extracts and other alcoholic liquids; the valuation of pepsin, etc.

The assaying and standardization of opium and its preparations is introduced at the end of this course.

C. DEPARTMENT OF BOTANY, MICROSCOPY AND PHARMACOGNOSY

Doctor Jensen. Two laboratory periods a week of two hours each.

C2. Pharmacognosy.—Study of the organic crude drugs. The most important drugs are thoroughly studied with the aid of the microscope. This course is designed to develop a capacity to interpret and apply the pharmacopœial descriptions for the identification of individual drugs and to form a correct judgment of their quality.

Good specimens of about two hundred of the most important plant drugs are furnished to each student for this work.

E. MATERIA MEDICA AND THERAPEUTICS

Assistant Professor Kahn. Two lectures a week.

The properties, action, uses and doses of drugs and medicines, including so much of therapeutics and toxicology as is indispensable to the intelligent and safe practice of pharmacy. Instruction is also given in relation to "first aid to the injured" and other emergency aid which pharmacists may properly render.

F. PHARMACEUTICAL ECONOMICS

Mr. Wooten. One lecture a week throughout six weeks.

This course was established to meet the needs of students who have had no drug store training, as well as of those whose training has been inadequate, in order to provide a knowledge of the business side of pharmacy. The work embraces business building, methods of gaining and retaining patrons and of establishing and maintaining proper business relations between the pharmacist and the public, the pharmacist and the physician, and the pharmacist and his fellow pharmacists. It includes such subjects as advertising, salesmanship, buying, the arrangement and care of stock and the proper conduct of a pharmacy with regard to approved commercial methods, economy, etc., to the end that the practice of pharmacy may be financially profitable.

G. *Mr. Woollett* gives a short course of class exercises designed to teach the student ACCOUNTING, including the essentials of the business methods necessary in conducting the affairs of a drug store.

The course in Urine Analysis (Course B9) is also offered to students registered as candidates for the degree of Graduate in Pharmacy. The fee for this course when taken separately is fifteen dollars. It is given without additional cost in the course for the degree of Pharmaceutical Chemist.

Courses for the Degree of Pharmaceutical Chemist

All the courses for the degree of Graduate in Pharmacy as described in the foregoing pages constitute parts of the curriculum for the degree of Pharmaceutical Chemist. In addition the following courses are required:

FIRST YEAR

A. DEPARTMENT OF PHARMACY

Professor Oldberg. One lecture weekly through about six weeks.

A17. SPECIAL COURSE ON MISCELLANEOUS PRODUCTS not treated of elsewhere, which are made or supplied by pharmacists, including sanitary and hygienic preparations, etc.

B. DEPARTMENT OF CHEMISTRY

B6. *Professor Gordin and Mr. Harrison.* Forty-five laboratory periods of three hours each, supplemented by one weekly recitation.

GRAVIMETRIC ANALYSIS.—Fundamental operations characteristic of general methods and special processes employed in the gravimetric determination of inorganic substances, including advanced modern methods and the application of this work to pharmaceutical and commercial requirements.

PHARMACEUTICAL TESTING (Course B5), as described among the second year courses in chemistry for the degree of Graduate in Pharmacy, is taken by students registered in the course for the degree of Pharmaceutical Chemist in the latter part of their first year. Forty-five laboratory periods of three hours each.

SECOND YEAR

A. DEPARTMENT OF PHARMACY

A18. *Professor Oldberg.* Six special lectures.

THE PRINCIPAL PHARMACOPŒIAS OF THE WORLD.—The general lessons taught by a comparison of the scope, style of construction, materia pharmaceutica, nomenclature, preparations, general directions and other important features of foreign pharmacopœias and formularies with those of the United States.

A19. *Assistant Professor Miner.* Twenty-eight laboratory periods of three hours each.

ORGANIC CHEMICAL PREPARATIONS.—The production of organic chemical compounds of pharmaceutical importance or illustrating general methods. Among the substances made by the students are ether, chloroform, iodoform, several organic acids, halogen derivatives of hydrocarbons, nitrobenzene, aniline, urea, acetanilide, dithymol di-iodide, artificial oil of wintergreen, ethyl nitrite, ethyl acetate and various other esters.

B. DEPARTMENT OF CHEMISTRY

B7. *Professor Gordin.* About fourteen special lectures on IMPORTANT CHEMICAL CONSTITUENTS OF PLANT DRUGS, such as alkaloids and glucosides, and upon certain important practical applications of CHEMICAL PHYSICS, including the use of the polariscope and other instruments in chemical work.

B8. *Assistant Professor Patterson.* Twenty-four laboratory periods of three hours each.

URINE ANALYSIS, qualitative and quantitative. The detection or determination of constituents of urine which are of importance in the diagnosis of disease.

B9. *Assistant Professor Patterson.* Forty laboratory periods of three hours each.

ADVANCED COURSE IN PHARMACEUTICAL TESTING AND DRUG ASSAYING.—A study of the principles and methods employed in the assay of drugs and preparations containing alkaloids, illustrated by laboratory practice in the assays of cinchona, extract of nux vomica, belladonna, aconite, guarana, etc. The examination of volatile oils, including the determination of important constituents, such as phenols, aldehydes, alcohols and esters. Practice in the determination of melting points and boiling points. Other quantitative determinations, such as the assay of spirit of nitrous ether and phenol. The valuation of pepsin, pancreatin and diastase preparations.

B10. *Assistant Professor Patterson.* Forty laboratory periods of three hours each.

FOOD AND SANITARY ANALYSIS.—The examination of water to determine its potableness and fitness for household use. The examination of milk, butter, baking powders and food products generally. This course includes laboratory practice in the determination of nitrogen by the Kjeldahl method and its modifications, the determination of the iodine absorption value, saponification value, etc. The detection of food preservatives, such as boric acid and borax, sodium benzoate and formaldehyde. Practice in the methods employed for determining specific gravity.

Physical examinations requiring the use of the polariscope, Zeiss Butyro-refractometer and Babcock milk tester are made.

C. DEPARTMENT OF BOTANY, MICROSCOPY AND PHARMACOGNOSY

Doctor Jensen. Twenty-one laboratory periods of two hours each.

C3. COMMERCIAL MICROSCOPY.—A course designed to train the student for the duties of the pharmaceutical chemist and public microscopist in the examination of powdered drugs, spices and food products. Comparisons of pure and adulterated products.

The course includes work with the camera lucida and polariscope.

H. BACTERIOLOGY

Assistant Professor Willard. Thirty-nine laboratory periods of three hours each, through thirteen weeks.

Bacteria in health and disease. Preparation of culture media. Culture methods and methods of staining. The work usually required for sanitary purposes.

Program of Special Course for Food and Drugs Chemists and Inspectors

This program occupies six months, from September to April It is open to graduates who have had the necessary preliminary courses in chemistry and other branches, embracing not less than twelve hundred hours' instruction and practical work in pharmacy, chemistry and materia medica.

The courses included in the program, subject to such modifications as may be called for by the student's preliminary work, are: A17, A18, A19, B6, B7, B9, B10 and C3, together with either B8 or Course H.

GRADUATES

1908

Degree of Pharmaceutical Chemist

Felix Cajulis	*Philippine Islands*
James Lewis Clay	*Chicago*
Joseph Thomas Dvorak	*Owatonna, Minn.*
Albert George Eichler	*Hampshire*
Oscar A. Grulke	*Atlantic, Iowa*
Loren M. Haeseler	*Lisbon*
John Elwood Howell	*Sioux Falls, S. D.*
Eugene O. Leonard	*Pocatello, Idaho*
Herbert Samuel McDill	*Port Neches, Texas*
Ferdinand Wilhelm Nitardy	*Owatonna, Minn.*
Herschel Edwards Potter	*Piggott, Ark.*
Forrest Raymond Robertson	*Houston, Texas*
Emmett B. Switzer	*Albany*
Louis Richard Wernecke	*Winnetka*

Degree of Graduate in Pharmacy

Roy M. Bergen	*Petersburg*
Friedrich Wilhelm Blomenkamp	*Hastings, Neb.*
Alden Scott Boyer	*Cresco, Iowa*
James M. Caris	*Mt. Pleasant, Mich.*
Hugo William Druehl	*Salt Lake City, Utah*
Herman Herbert Duffey	*Anderson, Ind.*
Albert George Eichler	*Hampshire*
Peter J. Eulberg	*Dell Rapids, S. D.*
John James Foley	*Davenport, Iowa*
Elmer Jonathan Freeman	*Chicago*
Alfred Frederick Geahart	*Chicago*
Oscar A. Grulke	*Atlantic, Iowa*
Holly Parke Harris	*Corning, Iowa*
Walter Sterling Horn	*Mt. Pleasant, Mich.*
George Howard	*Hanna City*
True Howard	*Peoria*
Louis Edward Johnson	*St. Charles*
Fred Clifford Jones	*Alamosa, Colo.*
Eugene O. Leonard	*Pocatello, Idaho*
August William Lindstadt	*Philipsburg, Mont.*
Roy W. Markham	*Rhinelander, Wis.*
John Robert McKinney	*Carbondale*
William Warren McMaster	*Peoria*
Linnie Eloise Nixon	*Freeport*
Ernest O'Neal	*Tuscola*
Gustave Charles Paesler	*Chicago*
Robert Whitelife Pease	*Highwood*
Otto Rudolph Peters	*Salt Lake City, Utah*
Charles Edgar Pettyjohn	*Farmington*
Alfred Champlin Proudfoot	*Chicago*

Fountain Washington Ragland	*Montgomery, Ala.*
Henry Raithel	*Deming, N. M.*
Adelbert Willis Russell	*Sussex, Wis.*
Robert Winfield Sterling	*Dixon*
Milo Cornelius Taylor	*Chicago*
Samuel Rogers Taylor	*Jamestown, N. D.*
Raymond Milner Thompson	*Carbondale*
Alfred N. Thorsen	*Newark*
Robert Louis Trunk	*Chicago*
Harold Harvey Wagner	*Marietta, Ohio*
Warren Nelson Walker	*Howard, S. D.*
John Calhoun White, Jr	*Hazelhurst, Miss.*

STUDENTS

1908-1909

Course for the Degree of Pharmaceutical Chemist

Students taking this course in two years of nine months each are indicated by (*a*); those taking it in three years of six months each are marked (*b*). Students marked (*c*) are not candidates for graduation.

SECOND YEAR

Alva Lee Adams (*b*)	*Illinois*
Charles Warren Beless (*b*)	*Utah*
Jay Orison Browder, Ph. G	*Illinois*
Ernest Harlan Coburn, Ph. G	*Ohio*
Matthew Marion Finlay (*a*)	*Illinois*
Andrew Gerard Frericks (*a*)	*Illinois*
Chauncey William Gaeth (*b*)	*Nebraska*
Marcellino Mendoza Gallardo (*a*)	*Philippine Islands*
James Patrick Galligan (*a*)	*Illinois*
James Lester Hyrup (*b*)	*Illinois*
Philip Emile Jameson (*a*)	*Illinois*
Frank Ray King (*a*)	*Michigan*
Lloyd August King (*a*)	*Ohio*
Max William Kolb (*a*)	*Wisconsin*
Charles Augustus Loeffelbein (*b*)	*Wisconsin*
Sverre P. Nordvold (*b*)	*Minnesota*
George Otto Panzer (*a*)	*Nebraska*
Alexander Constantine Rizos (*b*)	*Greece*
John Hunter Scholes (*b*)	*Illinois*
Louis Schwerdt (*a*)	*Illinois*
Charles Edward Seaton (*b*)	*Colorado*
Albert Lester Shults (*b*)	*Illinois*
Walter S. Wagner (*b*)	*Illinois*
David Clark Watson (*b*)	*Utah*
Guy Kenneth Wold (*a*)	*Minnesota*
Roy Ernest Zobel (*a*)	*Colorado*

FIRST YEAR

Elmer Reed Abbott (*b*)	*Illinois*
Walter Emil Ammermann (*a*)	*Michigan*
Clarence Walter Bergman (*a*)	*Illinois*
William Larrabee Carr (*a*)	*Illinois*
Walter Carrick (*b*)	*Iowa*
Edward Devlin (*a*)	*Illinois*
Stanislaw Dowiatt, B. S. (*a*)	*Illinois*
Mark Matthew Duffy (*a*)	*Wisconsin*
Carl Fred Ekstam (*a*)	*Iowa*
William Ellingson (*a*)	*South Dakota*
Herbert Wilson Harris (*c*)	*Illinois*
Verne David Hawley (*b*)	*Illinois*
John Michael Heinen (*b*)	*Indiana*
James Shephard Honeyman (*b*)	*Iowa*
Herbert Austin Isham (*b*)	*South Dakota*
Raphael Jacobson (*a*)	*Illinois*
Ernest Stanley Kaplan (*b*)	*Minnesota*
Jay Kaplan (*a*)	*Illinois*
Charles Katzenberg (*a*)	*Illinois*
Edward Samuel Kaufmann (*a*)	*Ohio*
Wilbur Lloyd Kingsley (*b*)	*Pennsylvania*
Joseph Martin Knochel (*a*)	*Illinois*
Walter Anthony Krafft (*b*)	*Illinois*
Chris Wilbur Lee (*a*)	*Minnesota*
Armin Stoy Lindemann (*a*)	*Indiana*
Glen Thomas Martin (*c*)	*Illinois*
Charles David McKelvey (*a*)	*Indiana*
Earl Orin Morrison (*a*)	*Illinois*
James Patrick O'Rourke (*a*)	*Illinois*
Robert James Orr (*a*)	*Illinois*
Joseph Dwight Pickard (*a*)	*Illinois*
Carson Hosmer Porter (*a*)	*Illinois*
Walter Leon Pulley (*b*)	*Illinois*
Thomas Henry Schopp (*b*)	*Illinois*
Charles Darwin Shaver (*a*)	*Ontario, Canada*
Arthur Angell Sprague (*a*)	*Michigan*
Lougin Louis Tabenski (*a*)	*Illinois*
Traisius Joseph Tuohy (*a*)	*South Dakota*
Harry George Walter (*a*)	*Kansas*
Benjamin Greeley Warner (*a*)	*Texas*
George Winkley, M. A., (*a*)	*Illinois*
Clyde Leonard Worthington (*a*)	*Illinois*
Walter Wyszynski (*c*)	*Illinois*
Emil Wilmer Youngren (*b*)	*Illinois*

Course for the Degree of Graduate in Pharmacy

SECOND YEAR

Arthur Stanley Arnold	*Illinois*
Kenneth Walter Bakens	*Wisconsin*

Jose Policarpio Bantug	*Philippine Islands*
Paul Adolph Brecht	*South Dakota*
Charles Arthur Cotton	*Iowa*
Charles Raymond Crain	*Illinois*
Glen Griffin Dewey	*Wisconsin*
John M. Dodd	*Illinois*
Fred Jay Geyer	*New Mexico*
Walter Edgar Green	*Utah*
Halldor Halldorsson	*North Dakota*
Albert Martin Harrison	*Illinois*
Charles Bernard Holmes	*Illinois*
Arthur W. Huff	*Indiana*
John Wesley Jennings	*Mississippi*
Charles Adam Keim	*Illinois*
St. Clair Madden	*Illinois*
Walter I. McElrath	*Illinois*
Maurice Carson McLuen	*Iowa*
Louis William Oswald	*Illinois*
Foster Rob Rogers	*Wyoming*
Bernardo Samson	*Philippine Islands*
Cecil George Shirley	*Indiana*
John Thomas Slama	*Illinois*
Mark V. Smith	*Illinois*
Robert J. Stubbs	*Illinois*
Melvin Dale Sweetland	*Illinois*
Neil Williamson Tarbell	*South Dakota*
Roy Warren	*New York*
Leslie Harwood Wire	*Illinois*

FIRST YEAR

John Allegretti	*Illinois*
Hiron Willard Allen	*Illinois*
Massey Cornelius Ball	*Texas*
Earl Barnette	*Nebraska*
Harley Leroy Bellamy	*Nebraska*
John Joseph Blake (*c*)	*Illinois*
Harry C. Boe (*c*)	*Illinois*
George Dwight Butler	*Nebraska*
Antonio Victor Camodeca	*Illinois*
Silvio Umberto Camodeca	*Illinois*
Henry A. Carpenter	*Illinois*
James Francis Cunningham	*Arkansas*
Hiram Wilbern Currey	*Indiana*
Charles Custer	*Illinois*
Joseph Daniel Ernst (*c*)	*Illinois*
Charles Harvey Esackson	*Illinois*
Mrs. Luella Ferguson	*Illinois*
Clement John Fitzgerald	*Iowa*
Cyril Clinton Folkrod	*Illinois*
Mott Foresman	*Iowa*
Victor Frolich	*Illinois*
Charles Frederick Fruehling	*Iowa*

Joseph Peter Graf (*c*)	*Iowa*
D. Gratton Harden	*Nebraska*
F. W. Harmon	*Illinois*
Samuel Heiss	*Illinois*
Harlow Clay Holabird, Jr.	*Illinois*
Earl Carlton Hughes	*Nebraska*
Harry Frank Isted	*Illinois*
Roger J. Jones	*Illinois*
Edwin L. Kadlec	*Illinois*
Isadore M. Kahanovske	*Illinois*
Frank Martin Keeley (*c*)	*Illinois*
Edward Herman George Kreiling	*Illinois*
Michael Anthony Lapjansky	*Indiana*
Harry Martin Lappley	*Wisconsin*
Will White Largent, Jr.	*Illinois*
Matthias Tillman Lauer	*Illinois*
Emil Ernest Lehmann	*Illinois*
Charles Edward Leonhardt	*Illinois*
John Joseph Levitt	*Illinois*
Harold James Lincoln	*Wisconsin*
A. W. Logan	*Illinois*
Raymond Lovett (*c*)	*Illinois*
Paul William Macker (*c*)	*Nebraska*
John Allen McAfee	*Colorado*
Frank Edwin McKamy	*Illinois*
Edward Miller	*Illinois*
Leonard Holland Morrow	*Montana*
William John Mueller	*Minnesota*
Alexander Frank Murawski (*c*)	*Illinois*
Carter Cox Norris	*Illinois*
Olof Howard Ohlson	*Illinois*
Bernard Samuel Olson (*c*)	*Illinois*
Albert J. Owells	*Illinois*
Edward Lewis Peoples	*South Dakota*
Gustav Joseph Peterson	*Oklahoma*
Fred Albert Quilling	*Wisconsin*
Ardwood John Rabb	*Iowa*
Martin Arthur Roth	*Ohio*
Fred Oswald Rueckert	*Illinois*
Percy Whitford Savage	*Montana*
William Arthur Schoen	*Minnesota*
John Ray Sims	*Illinois*
Charles Frederick Snyder (*c*)	*Illinois*
Frank Walter Steimle	*Illinois*
Thaddeus Cornelius Stiles	*Illinois*
Daniel J. Sullivan	*Illinois*
Edward Patrick Taheny	*Illinois*
Oliver Jackson Tobias (*c*)	*Illinois*
Herman Eugene Wagener	*South Dakota*
James H. Wilkinson	*Alabama*
Fred Douglas Wilson	*Mississippi*
Arthur Philip Zimmer	*Illinois*

Prospective Students

Prospective students are requested to send their names and addresses with information as to age and general education. Tear out this page and mail it to the School of Pharmacy of Northwestern University, 87 Lake Street, Chicago.

As a prospective student I desire to be placed on the mailing list of the School of Pharmacy to receive circulars and other information.

My age is.................

General education ....

....

I intend taking the course for the degree of ....

....

Remarks ....

....

Signed..................................

Address................................

....

Officers of the Alumni Association

President,	Charles A. Storer	'88
Vice-President,	William H. Harrison	'03
Vice-President,	George C. Hansen	'05
Vice-President,	Ralph H. Smith	'94
Treasurer,	Henry F. Schaper	'93
Secretary,	George D. Oglesby	'91
Trustees,	Henry F. Hauth	'07
	Otto R. Peters	'08
	Joseph F. Dvorak	'08

All alumni of the School are earnestly requested to keep the officers of the Association informed as to their location. At the present time a considerable number of the graduates of the School cannot be reached by letters or other communications because their addresses are unknown. Inquiries at the School for such students cannot be answered, a fact which not infrequently is a distinct disadvantage to the alumnus who has failed to call attention to his change of address.

Arrangements are being made to publish, from time to time, items of interest in relation to the alumni and all such information will be gladly received and used to the best possible advantage. Send communications pertaining to the addresses of alumni, or items of interest in relation to them, to

George D. Oglesby, Secretary,
228 Thirty-first Street, Chicago.

NORTHWESTERN UNIVERSITY BUILDING
Lake & Dearborn Streets
Chicago